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Technical Memorandum NESDIS 2

THE GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE DATA COLLECTION SYSTEM

Washington, D.C.
June 1983

U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration / National Environmental Satellite, Data, and Information Service

NOAA TECHNICAL MEMORANDUMS

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NESS 110 GOES Data Collection Program. Merle Nelson, August 1980.
NESS 111 Earth Locating Image Data of Spin-Stabilized Geosynchronous Sateliites. Larry N. Hambrick and Dennis R. Phillips, August 1980. (PB81 120321)
NESS 112 Satellite Observations of Great Lakes Ice: Winter 1978-79. Jenifer Wartha-Clark, September 1980. (PB81 167439)
NESS 113 Satellite Identification of Surface Radiant Temperature Fields of Subpixel Resolution. Jeff Dozier, December 1980. (PB81 184038)
NESS 114 An Attitude Predictor/Target Selector. Bruce M. Sharts, February 1981, 21 pp. (PB81 200479)
NESS 115 Publications and Final Reports on Contracts and Grants, 1980. Nancy Everson (Compiler), June 1981. (PB82 103219)
NESS 116 Modified Version of the TIROS N/NOAA A-G Satellite Series (NOAA E-J) - Advanced TIROS-N (ATN). Arthur Schwalb, February 1982, 29 pp. (PB82 194044)
NESS 117 Publications and Final Reports on Contracts and Grants, 1981. Nancy Everson (Compiler), April 1982. (PB82 229204)
NESS 118 Satellite Observation of Great Lakes Ice - Winter 1979-80. Sharolyn Reed Young, July 1983.
NESS 119 Satellite Observations of Great Lakes Ice: 1980-81. A.L. Bell, December 1982, 36 pp. (PB83 156877)

NESDIS 1 Satellite Observations on Variations in Southern Hemisphere Snow Cover. Kenneth F. Dewey and Richard Heim, Jr.

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Douglas H. MacCallum and
Michael J. Nestlebush

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June 1983

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FOREWORD

This is a revision of NOAA Technical Report NESS 78, Geostationary Operational Environmental Satellite/Data Collection System, July 1979. The data collection system has had a major enhancement implemented and there have been several changes in application procedures since the July 1979 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.
March 1983

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CONTENTS

	PAGE
FOREWORD	ii
Abstract	1
1. INTRODUCTION	2
1.1 Geostationary Operational Environmental Satellite System	2
1.1.1 Background	2
1.1.2 Standby Satellite	2
1.1.3 Operations During Solar Eclipses	5
1.1.4 Present Operational Modes	5
2. GOES DATA COLLECTION SYSTEM	6
2.1 GOES DCS	6
2.2 The Four Functional Subsystems of the GOES DCS	6
2.2.1 Type of DCP's	6
2.2.2 Self-timed Data Collection Platforms	6
2.2.3 Self-timed and Random Reporting DCP's	8
2.2.4 Random Reporting DCP's	8
2.2.5 Interrogate DCP's	8
2.2.6 Message Formats	9
2.3 East and West Spacecraft Message Relay	9
2.4 Data Error Probability	14
2.5 NESDIS Ground System	14
2.5.1 Wallops CDA	14
2.5.2 Central Data Distribution Facility	17
2.5.3 System Control	17

PAGE

2.5.4 Data Dissemination 17

2.5.5 System Alarms 18

3. AGREEMENTS FOR USE 19

3.1 Procedures for Applying to use the GOES DCS 19

3.1.1 Limitations and Eligibility 19

3.1.2 Application Requests 19

3.2 Costs 20

3.3 Direct Data Readout from the GOES DCS 20

3.4 Data Collection Platform Sources 21

FIGURES

Figure Page

1-1 Geometry of the DCS Coverage 3

1-2 Synchronous Satellite Overlay Map 4

2-1 The Four Functional Subsystems of the GOES DCS 7

2-2 The Long Transmission Response Format 10

2-3 The Short Transmission Response Format 10

2-4 USASCII Character Assignments 11

2-5 Pseudo ASCCII Binary Data Format 12

2-6 East and West Spacecraft Channel Identification 13

2-7 DAMS Quality Measurement 16

APPENDICES

Page

A GOES DCS Reply Channels and Frequencies A-1

B Platform Data File B-1

C Letter of Sponsorship C-1

D GOES DCS Questionnaire D-1

E	International Memorandum of Agreement	E-1
F	Domestic Memorandum of Agreement	F-1
G	Operating Agreement	G-1
H	List of Ground Equipment Manufacturers	H-1
I	List of Data Collection Platform Manufacturers	I-1

NOAA TECHNICAL MEMORANDUM NESDIS 2
THE GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE DATA COLLECTION SYSTEM

DOUGLAS H. MACCALLUM
MICHAEL J. NESTLEBUSH

NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE, NOAA, WASHINGTON, D.C.

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 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

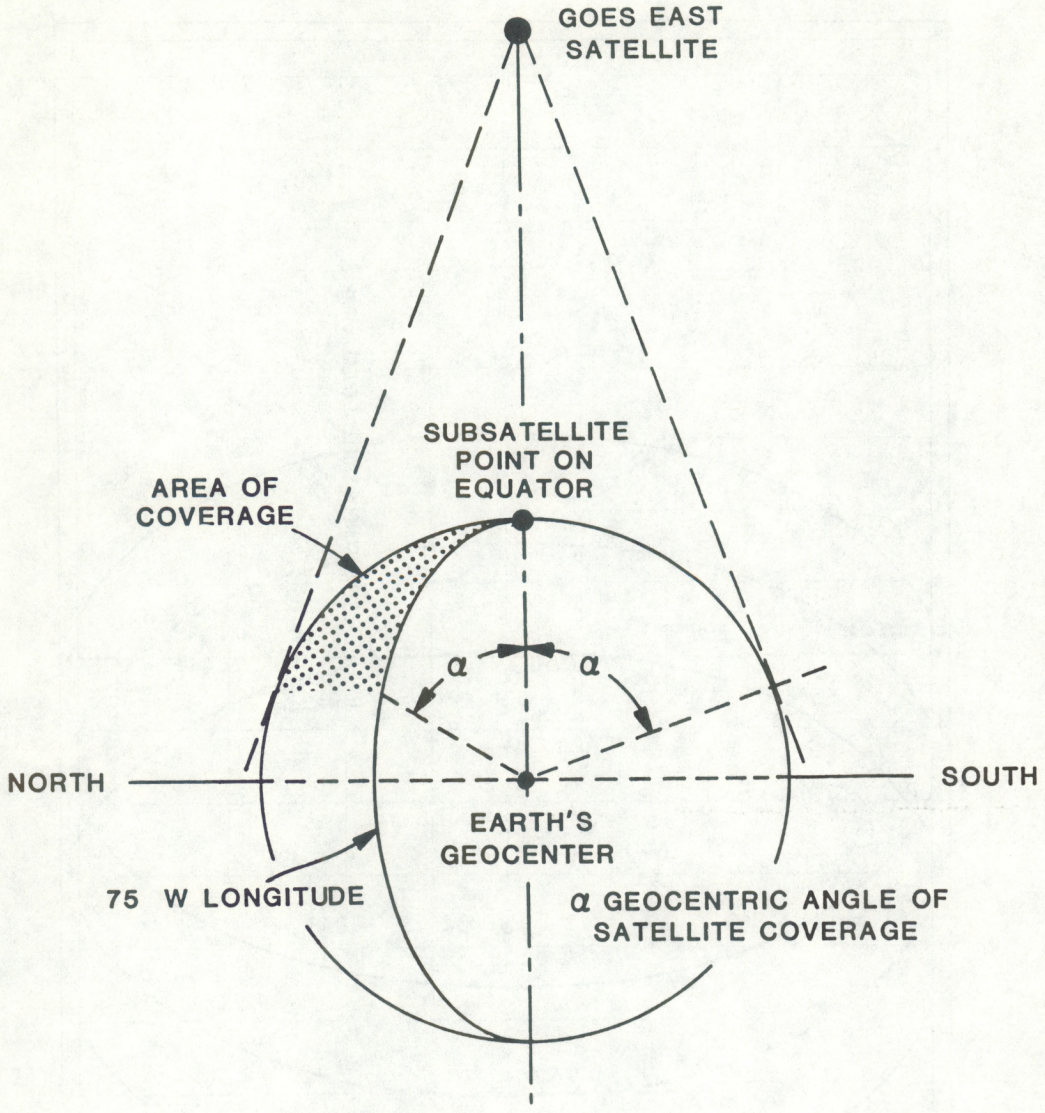
1.1.1 Background

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) formerly the National Earth Satellite Service (NESS) of the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. The system was developed at 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 to properly equipped receiving stations in radio view of the GOES. The other subsystems include an image instrument (Visible Infrared Spin Scan Radiometer - VISSR) capable of making full Earth disc images in approximately 18 minutes in visible or infrared portions of the spectrum or in multispectral scan mode (up to 3 infrared spectral channels). The VISSR instrument also can make atmospheric soundings. This mode of operation is called the VISSR Atmospheric Sounding (VAS) operation. In addition, a space environment monitor (SEM) instrument is carried in the spacecraft. This instrument performs three functions: measurement of magnetic field strength and direction in the vicinity of the spacecraft, assessment of solar x-ray flux and sensing of energetic particles that make up the solar wind and radiation belts around the Earth. Also, a weather facsimile (WEFAX) service is operated that relays satellite imagery and other graphic products formatted in the NOAA ground system and relayed by landline from Suitland, Maryland, to the Wallops Command and Data Acquisition (CDA) station in Virginia for transmission via the GOES.

There are two operational GOES located in Earth-synchronous orbits over the Equator at 75°W and 135°W longitudes. These spacecraft have a radio view coverage of most of the Earth from 0° westward to 165°E longitude. Poleward coverage is limited to about 77° north or south latitudes and is further restricted to lower latitudes in either direction from the 75° and 135° 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 in orbit at longitude 107°W (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.



GEOMETRY OF THE DCS COVERAGE

FIGURE 1-1

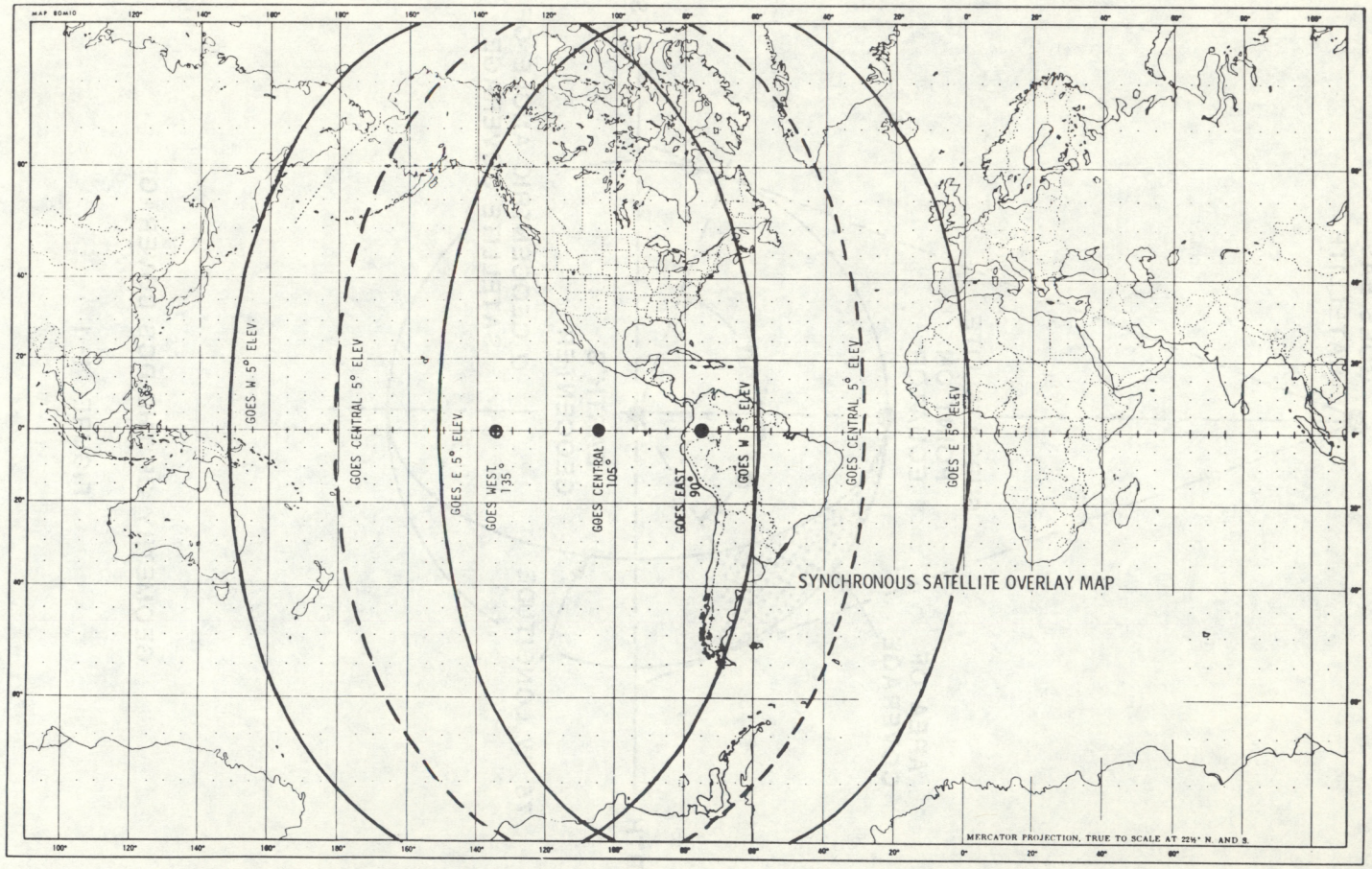

GOES W 5° ELEV
GOES CENTRAL 5° ELEV
GOES E 5° ELEV
GOES WEST 135°
GOES CENTRAL 105°
GOES EAST 90°
GOES W 5° ELEV
GOES CENTRAL 5° ELEV
GOES E 5° ELEV
SYNCHRONOUS SATELLITE OVERLAY MAP
MERCATOR PROJECTION, TRUE TO SCALE AT 22½° N. AND S.

FIGURE 1-2

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 Data Collection Platform Interrogate Link (DCPI) and, at times, the Data Collection Platform Reply Link (DCPR) are transferred to the standby satellite for a specified period each day. This is necessary to conserve power in the spacecraft that is in eclipse and prevents any loss of data relay through the GOES DCS, except for those data collection platforms (DCP's) that are out of radio view of the central satellite. In order to facilitate the direct readout ground system operations, the scheduled times for the change from the operational spacecraft to the standby spacecraft are the same for each day of eclipse. The schedule for this operation is relayed to the user community prior to its implementation. The operation is transparent to those users who utilize the NESDIS Ground System for relay of their data.

1.1.4 Present Operational Modes

The present system supports two operational modes (interrogate and self-timed) and an experimental random reporting mode. 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 insure 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.

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 and GMS spacecraft. The present ground system is limited to supporting 80 channels and 5,000 DCP's.

The DCS has the capacity for handling at least 12,000 messages from DCP sites via the spacecraft transponder in each 1 hour period. This figure is based on the present policy of assigning 1 minute transmission windows for each of the 200 domestic channels available, i.e., 60 windows per hour over 200 channels (60 x 200 = 12,000). However, with advances being made in the stability and accuracy of timing oscillators, transmission windows of 15 seconds may become standard in the future. Data transmission rate for all operational modes is 100 bps (bits per second).

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. Central Data and Dissemination Facility (CDDF)

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 otained from NESDIS. The DCP's available to the user community, at this time, are:

Self-timed
Self-timed and Random Reporting
Random Reporting
Interrogated
International Self-timed

2.2.2 Self-timed Data Collection Platforms

Self-timed DCP's are platforms which contain only a transmitter and some form of timing source which is preprogrammed to report during a specific hour, a specific minute 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

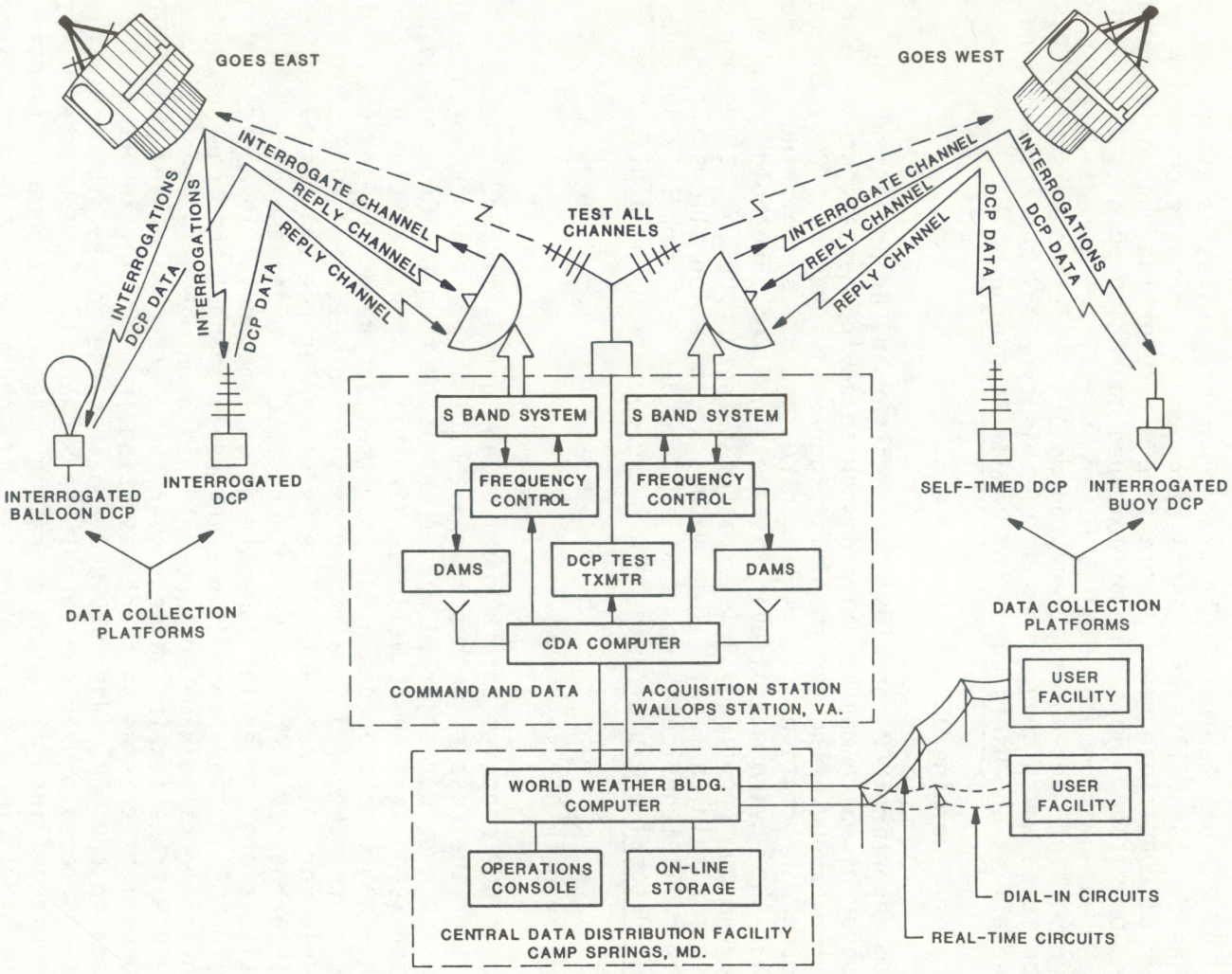

GOES EAST
GOES WEST
INTERROGATE CHANNEL
REPLY CHANNEL
TEST ALL CHANNELS
INTERROGATIONS
DCP DATA
S BAND SYSTEM
FREQUENCY CONTROL
DAMS
DCP TEST TXMTR
CDA COMPUTER
COMMAND AND DATA ACQUISITION STATION WALLOPS STATION, VA.
INTERROGATED BALLOON DCP
INTERROGATED DCP
SELF-TIMED DCP
INTERROGATED BUOY DCP
DATA COLLECTION PLATFORMS
WORLD WEATHER BLDG. COMPUTER
OPERATIONS CONSOLE
ON-LINE STORAGE
CENTRAL DATA DISTRIBUTION FACILITY CAMP SPRINGS, MD.
USER FACILITY
DIAL-IN CIRCUITS
REAL-TIME CIRCUITS

FIGURE 2-1

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 once every three hours.

2.2.3 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.

2.2.4 Random Reporting DCP'S

The random reporting DCP contains a transmitter and broadcasts at random time the frequency of which may be charged when an environmental threshold has been 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. 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.

2.2.5 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, 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 schedule for interrogatable DCP's is stored at the CDA instead of in the DCP's. Interrogated DCP's may be interrogated as often as every 5 minutes in special situations, or as infrequently as once per day. In addition, some interrogate DCP's have a second or alert reply channel that can be used when a preset environmental parameter threshold has been met or exceeded. At this time, the DCP transmits its address over the alert channel and the NESDIS Ground System recognizes this as an alert resulting in a special interrogation being transmitted to the DCP. When the DCP receives the special interrogation, it transmits its message over the normal reply channel. Interrogated DCP's may also be commanded into different operating modes. This command function is invoked by NESDIS (at the users request) 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 Users Interface Manual.

2.2.6 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.

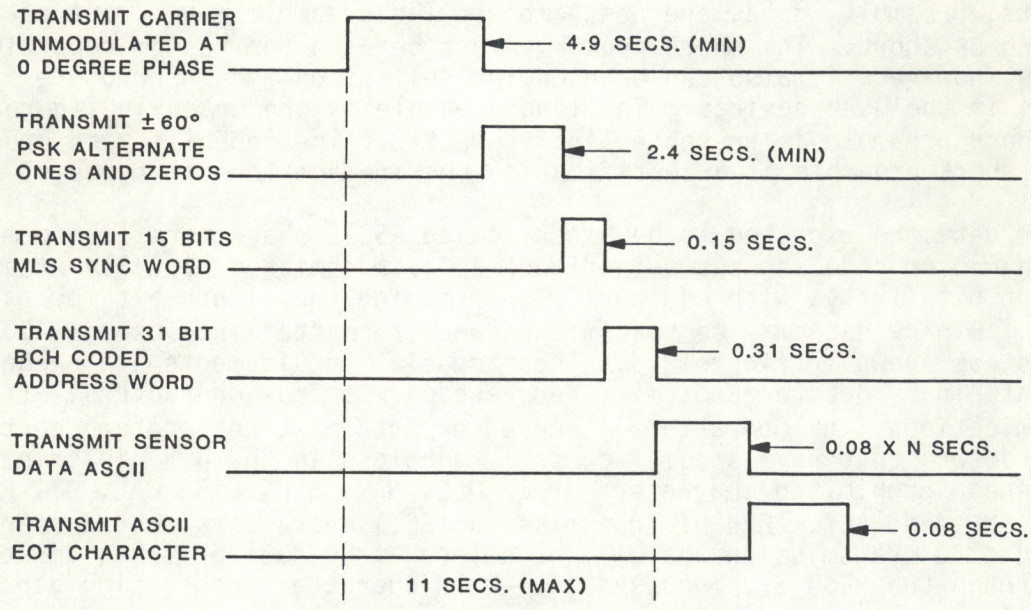
The sensor data are expected to be binary-coded ASCII characters (conforming to the 128-character code set shown in figure 2-4) transmitted serially (least-significant bit first), with odd parity determining the eighth bit for each character. Binary data may be transmitted when formatted into pseudo-ASCII characters, as shown in figure 2-5. These special requirements are needed to insure 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, ETX, 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 or $, 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.

2.3 East and West Spacecraft Message Relay

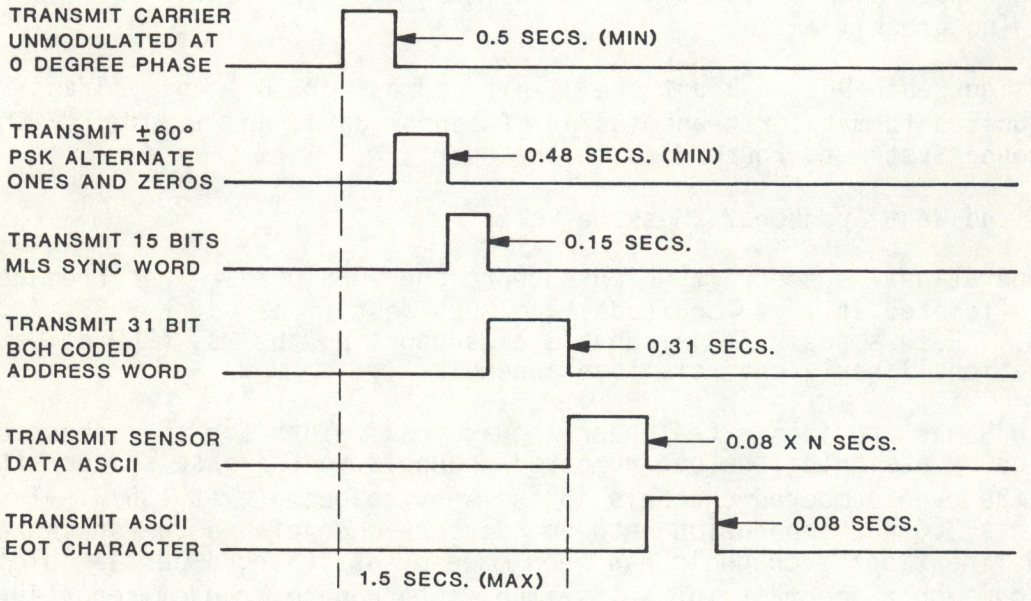
The two operational spacecraft which support the GOES DCS are referred to as GOES East (located at 75°W longitude) and GOES-West (located at 135°W longitude). Each spacecraft is capable of supporting the 233 (200 domestic, 33 international) reply channels (see appendix A).

The GOES DCS has provided extra channel guard band width for the domestic frequencies by assigning the odd-numbered channels to the east spacecraft at 75°W and the even-numbered channels to the west spacecraft at 135°W. This results in a 3.0 KHz separation between adjacent channels on the spacecraft. Further delineation of channels has been made by assigning a certain block of channels on each spacecraft for self-timed, interrogate, random reporting, and those users with direct readout ground systems (see figure 2-6). 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.



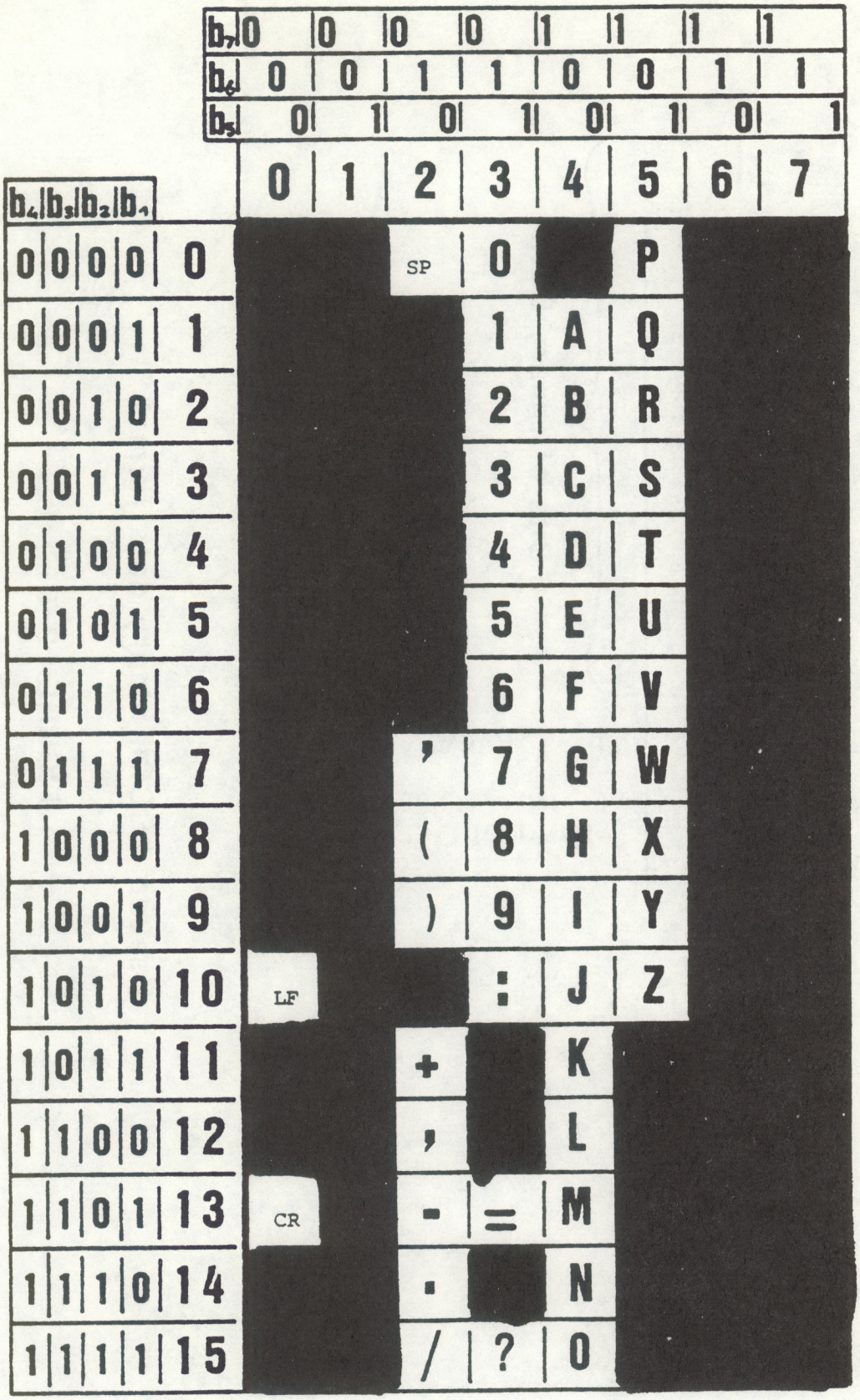
LONG TRANSMISSION RESPONSE FORMAT

FIGURE 2-2



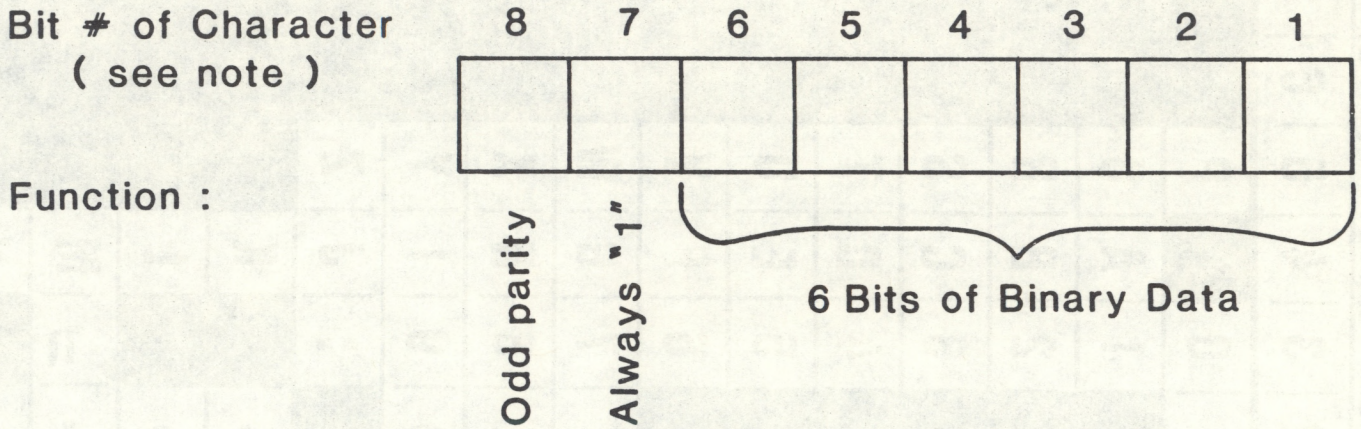
SHORT TRANSMISSION RESPONSE FORMAT

FIGURE 2-3



b_4 b_3 b_2 b_1	b_7=0 b_6=0 b_5=0	b_7=0 b_6=0 b_5=1	b_7=0 b_6=1 b_5=0	b_7=0 b_6=1 b_5=1	b_7=1 b_6=0 b_5=0	b_7=1 b_6=0 b_5=1	b_7=1 b_6=1 b_5=0	b_7=1 b_6=1 b_5=1
	0	1	2	3	4	5	6	7
0 0 0 0 0			SP	0	@	P	`	p
0 0 0 1 1			!	1	A	Q	a	q
0 0 1 0 2			"	2	B	R	b	r
0 0 1 1 3			#	3	C	S	c	s
0 1 0 0 4			$	4	D	T	d	t
0 1 0 1 5			%	5	E	U	e	u
0 1 1 0 6			&	6	F	V	f	v
0 1 1 1 7			'	7	G	W	g	w
1 0 0 0 8			(	8	H	X	h	x
1 0 0 1 9			)	9	I	Y	i	y
1 0 1 0 10	LF		*	:	J	Z	j	z
1 0 1 1 11			+	;	K	[	k	{
1 1 0 0 12			,	<	L	\	l	|
1 1 0 1 13	CR		-	=	M	]	m	}
1 1 1 0 14			.	>	N	^	n	~
1 1 1 1 15			/	?	O	_	o	DEL

FIGURE 2-4



NOTE : Bit # is order of transmission -- #1 bit is first

Pseudo ASCCII binary data format

FIGURE 2-5

EAST SPACECRAFT
ODD NUMBERED CHANNELS

1-39	41-69	71-93	95-111	113-145	147-165	167-199
Self-timed	S/T Direct Readout	Self-timed	Interrogate	Random Reporting	Spare	LANNION-Relay

WEST SPACECRAFT
EVEN NUMBERED CHANNELS

2-40	42-70	72-94	96-110	112-144	146-164	166-198
Self-timed	Self-timed Direct Readout	Self-timed	Interrogate	Random Reporting	Spare	Spare

FIGURE 2-6

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 and provided to the user from the CDDF at Camp Springs, Maryland. 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 which occasionally contain wide-band TIROS-N data relay transmissions. As the number of DCP's increases, somewhat less power is available to each simultaneously active channel. Furthermore, simultaneous operation of the VISSR 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 interfere 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 consists of the following: receive and transmit equipment with a controlling computer system at the Wallops CDA, a scheduling and dissemination computer system at the Central Data Distribution Facility (CDDF) in Camp Springs, Maryland, and dedicated high speed landline links connecting the two sites.

2.5.1 Wallops CDA

Messages are received from either operational spacecraft via S-band receiving sysems 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.

The DAMS units transfer these data to the Wallops CDA computers for transfer from the CDA to the CDDF over high speed dedicated circuits. A typical DCP message with the DAMS quality information is presented in figure 2-7. The DAMS measurements can be transmitted over the interrogate link to an appropriate piece of test equipment located at the DCP installation site. This allows the user to check the DCP for proper operation prior to leaving the installation site, thereby, significantly reducing the need to return a short time later due to an improperly operating DCP. A more detailed description of this test feature is discussed in the User Interface Manual.

The CDA computer also contains the schedule files for both self-timed and interrogation DCP's. The self-timed schedule file contains assigned reporting times for all scheduled self-timed DCP's in the DCS regardless whether they are active or deactive. Self-timed and interrogation schedule files are updated frequently due to the changing status of the DCP's in the system. The amount of storage space required to schedule a DCP varies with the reporting rate for the individual DCP. The NESDIS standard assignment of one DCP reporting for approximately one minute at 3-hourly intervals requires eight entries of 20 words for each reporting period (8 in 24 hours). This requires 160 words to schedule one DCP in the DCS. One sector of storage space at the CDA is equal to 128 words which equates to 1.25 sectors of storage space required to schedule one standard reporting DCP. One DCP reporting every hour requires 3.75 sectors of storage space at the CDA. Because of limited storage space in the current CDA computer system and the channel resource required, reporting periods more frequent than every 3 hours must be justified in writing and approved by NESDIS.

This schedule file is used by the computer to verify that each message received has the correct address, is reporting at the proper time, and is relayed over the correct channel. The system will generate an alarm if any of these conditions are abnormal or if a message scheduled to be received is not received.

The interrogation file operates much in the same manner as the self-timed file, except a command word is transmitted at the scheduled time which triggers a response from a specific DCP. If no response is received within a specified time period the file is checked to see if any retries are scheduled. If the DCP fails to respond to the initial command or after the scheduled number of retries, an "expected message not received" notice is placed in the users queue with the time of the initial interrogation and the time of each retry.

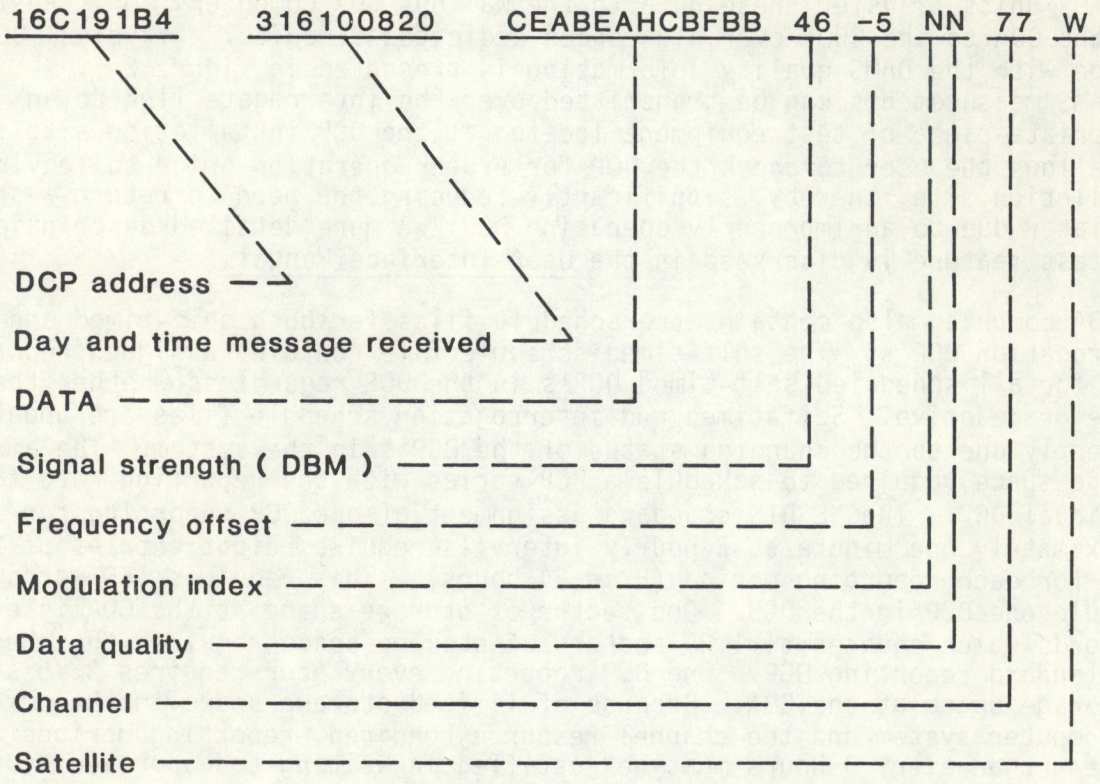

16C191B4
316100820
CEABEAHCBFBB
46
-5
NN
77
W
DCP address
Day and time message received
DATA
Signal strength (DBM)
Frequency offset
Modulation index
Data quality
Channel
Satellite

FIGURE 2-7

The CDA has two identical computer systems, with one system being on-line at all times. The backup system is updated by the CDDF computer. The dual computer systems at the CDA also serve as backup storage systems to the main system at the CDDF in case of a failure which would render both CDDF systems inoperative. This prevents the loss of data although data for dissemination would be delayed until the problem at the CDDF is corrected.

2.5.2 Central Data Distribution Facility

The CDDF is located in the World Weather Building at Camp Springs, Maryland, and has two identical computer systems. One system is on-line at all times. The off-line system is used for the generation of statistical reports used by management and by the DCS operator for analysis of system alarms as well as a backup to the on-line system. The dissemination circuits over which users' retrieve their data are part of this system. The CDDF computer system also contains the Platform Data Files (PDF's) for each DCP authorized to operate within the DCS, all user ID's assigned, and the storage queues assigned to each of these user ID's. Appendix B contains a typical PDF.

2.5.3 System Control

DCS operations are controlled by the on-line computer which handles the routine functions of message scheduling, status reporting, data reception, buffering, and dissemination. Manual operator intervention is provided for startup and other recovery procedures. The actual control of the DCS is exercised by comparison of real-time system activity to the system schedule stored in the computer.

2.5.4 Data Dissemination

Messages received from the CDA are routed to the proper user queue along with pertinent error information detected in processing the message. Data may also be routed to as many as three secondary users' queues. Secondary users are users who have an interest in data being collected by other users but, as a general rule, operate limited or no DCP networks of their own. The dissemination of these data and their format are explained in detail in the User's Interface Manual.

Messages are periodically sent by the CDDF computer to the CDA subsystem. These messages include platform addresses scheduled for activity, channel occupation, time of report, and whether the reporting platform is self-timed or requires interrogation.

Once a message is received by the DCS, it is entered in the system events log and stored in the appropriate user's queue to await dissemination. No sensor data received from a user's DCP are modified or decoded by the GOES DCS and the raw data are stored exactly as received from the DCP. The dissemination of the users' data, stored at the CDDF in the World Weather Building, may be accomplished through the use of the following dial-up facilities:

Circuit Type	Type	Data Rate	Modem	Telephone
Dial in	Synchronous	4800	Bell 208B	(301) 899-9450
Dial in	Asynchronous	1200	Bell 202C/202S	(301) 899-2520
Dial in	Asynchronous	300/110	Bell 103J	(301) 899-2521 (301) 899-6595 (301) 899-6596
Dedicated	Synchronous	2400/9600	User provided	

Detailed information concerning the use of these circuits is presented in the Users Interface Manual.

2.5.5 System Alarms

The CDA equipment receives the platform sensor data transmitted through the satellite transponder, performs DAMS quality measurements and character error checks, and temporarily stores all data. These received messages are checked at the CDA for expected addresses and transmitted to the CDDF, along with all DAMS measurements and pertinent error information. If a scheduled message was not received at the expected time, the system will generate an "expected message not received" message and place this message along with the address of the DCP in the proper users' queue. The occurrence of an unexpected message (DCP reporting does not appear in the schedule file) is analyzed by the computer to determine whether it was due to: a random reporting DCP (all messages from random reporting DCP's are unexpected), a self-timed DCP that has been activated by a user and no notice of the activation relayed to the DCS operator, a self-timed DCP which has reported in a time slot other than the time slot assigned to it, or a DCP reporting over a channel other than its assigned channel.

With the exception of random reporting DCP's, which are reporting over their assigned channel, all other conditions will generate system alarms which call attention to the DCS operator that an abnormal condition exists with respect to the message received. The DCS operator will follow appropriate investigative procedures to determine the cause of the alarm and will contact the operator of the DCP if investigations reveal that the DCP is operating in an abnormal manner and degrading system integrity. If the operator of the DCP is contacted by the DCS operator, it is necessary that the operator of the DCP take immediate action to correct the malfunction as it may be causing the loss of data to another user through interference.

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 the exception of certain private users' who may request proprietray 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 a 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
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 two types of MOA's: an International Memorandum of Agreement (see appendix E), and a Domestic

Memorandum of Agreement (see appendix F). The major difference in processing the two MOA's is the number of internal NOAA offices that must coordinate the approval of the agreement. The international MOA requires both the NOAA General Counsel and the NESDIS External Relations Staff to coordinate the approval whereas most domestic 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. In certain cases, an organization other than the one for whom data are being collected will operate the DCP's. For this arrangement NESDIS requires an Operating Agreement with the DCP network operator (see appendix G).

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 queues 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 PDF for each DCP assignment and returning it to NESDIS 30 days prior to deployment. 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 as 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 CDDF in the World Weather Building at Camp Springs, Maryland, if this method of dissemination 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 provide NESDIS a contact point (telephone number and individual who can be reached 24 hours per day) to receive information regarding these changes. A list of ground receive equipment manufacturers is furnished 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 I. 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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	401.7010	50	401.7745
2	401.7025	51	401.7760
3	401.7040	52	401.7775
4	401.7055	53	401.7790
5	401.7070	54	401.7305
6	401.7085	55	401.7820
7	401.7100	56	401.7835
8	401.7115	57	401.7850
9	401.7130	58	401.7865
10	401.7145	59	401.7880
11	401.7160	60	401.7895
12	401.7175	61	401.7910
13	401.7190	62	401.7925
14	401.7205	63	401.7940
15	401.7220	64	401.7955
16	401.7235	65	401.7979
17	401.7250	66	401.7985
18	401.7265	67	401.8000
19	401.7280	68	401.8015
20	401.7295	69	401.8030
21	401.7310	70	401.8045
22	401.7325	71	401.8060
23	401.7340	72	401.8075
24	401.7355	73	401.8090
25	401.7370	74	401.8105
26	401.7385	75	401.8120
27	401.7400	76	401.8135
28	401.7415	77	401.8150
29	401.7430	78	401.8165
30	401.7445	79	401.8180
31	401.7460	80	401.8095
32	401.7475	81	401.8210
33	401.7490	82	401.8225
34	401.7505	83	401.8240
35	401.7520	84	401.8255
36	401.7535	85	401.8270
37	401.7550	86	401.8285
38	401.7565	87	401.8300
39	401.7585	88	401.8315
40	401.7595	89	401.8330
41	401.7610	90	401.8345
42	401.7625	91	401.8360
43	401.7640	92	401.8375
44	401.7655	93	401.8390
45	401.7670	94	401.8405
46	401.7685	95	401.8420
47	401.7700	96	401.8435
48	401.7715	97	401.8450
49	401.7730	98	401.8465
		99	401.8480

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	401.8495	150	401.9245
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

INTERNATIONAL FREQUENCY BAND CHANNELIZATION

CHANNEL	FREQUENCY
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	402.0705
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

1. PLATFORM 3440C614
2. VERSION
3. USER ID BURPNW
4. PRIM CHAN 042
5. SEC CHAN 128
6. SATELLITE(E/W) W
7. TYPE(I/S/R/D) S
8. EMER FILE N/A
9. AUTOSCHED(Y/N) N/A
10. AS/TRN/11(A/T/E) A
11. RETRY MAX N/A
12. MSG LENGTH 662
13. PLANNED TIME 0121
14. MODE(T/N) N
15. ACT/DEACT(A/D) D
16. SCH/UNSC(S/U) S
17. DEF PLAT N/A
18. DEF CHAN N/A
19. USER A USGS01
20. USER B COEOMA
21. USER C BURSWR
22. MFG MODEL SUTRON-8004-B
23. NOMENCLAT
24. LATITUDE 42-44-00 N
25. LONGITUDE 110-56-09 W
26. AGENCY Bureau of Reclamation
27. ST TIME SLOT SIZE 0100
28. SCHEDULE 1 ST 012100-0300
29. SCHEDULE 2
30. SCHEDULE 3
31. SCHEDULE 4
32. TYPES OF DATA SENSED

Precipitation

Water level

Air temperature

33. STATE LOCATED IN IDAHO

CONTACT PERSON

A. General

Mr. Harry Smyth
Bureau of Reclamation
123 East Street
Boise, Idaho 83724
(601) 444-2983
FTS 763-2983

B. Maintenance

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 responsiblity 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 impede NOAA's ability to obtain valuable environmental data which NOAA otherwise would not be able 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, includng 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 Administator 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 cost 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 Staes. 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 platforms, any confidential treatment of data under 911.3, and for the acquisition of these data from those platfroms either directly from the satellite or from the NOAA GOES Data Collection Center at the World Weather Building in Suitland, Maryland.

(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 Administrant 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 identity 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 of 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 the Administrator of NOAA, Department of Commerce, Washington, D.C. 20230, within 30 days (excluding Saturdays, Sundays and legal holidays) of 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 no present requirement may be returned to the possession of he 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 holidays) 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 of these data together with any supporting information, to the Assistant Administrator for Satellites, within five days (excluding Saturdays, Sundays, legal holidays) of receipt of notice. The failure to object within prescribed time limit will be considered an acknowledgment 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 Saturdays, Sundays, and legal holidays) from receipt of the notice to seek judicial relief.

911.4 Continuation of GOES DCS

(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, (8) 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 DCS program, i.e., the principal investigator.

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

   Purpose of Data

   Data Perishability

   Final User of Data

2. Type of System:

   Interrogated

   Self-time

   Hybrid

3. Number of Platforms:

   Number of each Type of Platform

   Number of Platforms with Emergency Alarm Provision

   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

   Bits per Sensor Message

6. Desired Reporting Times:

   Interrogation Schedule

   Self-timed Schedule

7. Data Delivery:

   Dedicated circuits

   Dial-in (110, 300, 1200 Baud)

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. Individual who will sign Memorandum of Agreement (Include title, address, etc.)

11. Any other information that may be of interest and 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) [hereinafter referred to as the operator] and the user (agency), who will provide Data Collection Platforms and will use the data collected, [hereinafter referred to as the user], have agreed as follows:

I. Name of Program.

The program to which this Memorandum of Agreement [hereinafter referred to as Memorandum] applies shall be known as the "(User) GOES Data Collection System Program."

II. Purpose of Program.

III. Joint Understanding.

A. To qualify for collection by the GOES, the data from the user's Data Collection Platforms 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).

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 the Frequency Assignment Subcommittee/Interdepartmental 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.

C. The operator will normally not assign a channel to one user for exclusive use; however, such an assignment may be made when the user presents sufficient need 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.

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

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

G. Data Collection Platforms which the user plans to implement as part of the GOES Data Collection System (DCS) are subject to certification by the operator before deployment.

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

I. All transmissions from the Data Collection Platforms 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 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.

IV. Specific Undertakings on the Part of the Users.

The user shall:

A. Provide the operator a list of the user's Data Collection Platforms showing the type (self-timed, interrogate, random), where each is to be located, and which platforms are equipped with emergency alarm provisions.

B. Provide the operator notification prior to Data Collection Platform relocation.

C. Provide the operator with the data type and message load planned for each Data Collection Platform.

D. Provide the personnel, funds and equipment necessary to carry out the portion of the program at the Data Collection Platform location.

E. Operate and maintain the Data Collection Platforms in conformance with equipment performance standards as specified by the operator in: National Earth Satellite Service Self-timed Data Collection Platform Radio Set Specifications as revised November 1981.

F. 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 User Interface Manual, as revised April 1982.

G. Provide periodic reports, upon request from the operator on the

present application of the user's DCS data.

V. 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 Data Collection Platforms for meeting system performance standards.

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

D. Assign priorities for participation in the GOES DCS, scheduling purposes, 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 established operational schedules for collecting data from the user's Data Collection Platforms. Notification will be prior to activation of such scheduled changes unless the operator must enact schedule modifications to provide services for emergency warnings. Sudden adverse spacecraft conditions may also preclude the operator from providing the user notification prior to schedule changes. In any event, notification will be made as soon as possible.

VI. TERMINATION.

This Memorandum shall enter into force upon signature by both parties. It shall remain in force for years unless extended by written agreement of the parties.

The agreement may be amended with the written consent of the parties and may be terminated at the election of either party 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. This Memorandum may be extended and/or amended with the written agreement of the parties. Failure to use channel allocation for a period of twelve months, unless other arrangements are made in writing, will be considered automatically as notice by the user of termination of the user's requirement for use of the allocated channel.

Each party is responsible for ensuring that the provisions of this Memorandum of Agreement are in accord with its program requirements.

NESDIS Signature	Date	User Signature	Date

Appendix F

MEMORANDUM OF AGREEMENT

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS), of the National Oceanic and Atmospheric Administration (NOAA) [the operator] and the (user) (agency), [the user], the provider of Data Collection Platforms and the user of the data collected have agreed as follows:

I. Purpose of Program

This Memorandum of Agreement applies to the "(user) GOES Data Collection System Program" pursuant to which

II. Joint Understanding

A. To qualify for collection by the GOES Data Collection System (DCS), data from the user's data collection platforms 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 the Frequency Assignment Subcommittee/Interdepartmental Radio Advisory Committee, docket numbers 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.

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 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 their program.

F. Unless an exception is specified elsewhere in this Memorandum, data collected by the user shall be made available from NESDIS to other interested parties as appropriate.

G. Data collection platforms which the user plans to employ as part of the GOES DCS are subject to certification by the operator before deployment.

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

I. All transmissions from the data collection platforms to the GOES spacecraft will be coordinated with the operator prior to such transmissions.

J. NESDIS shall not be liable for any damage or injury brought about by the use of the GOES DCS.

III. Specific Undertakings on the Part of the User.

The user shall:

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

B. Provide the operator notification prior to data collection platform relocation.

C. Provide the personnel, funds and equipment necessary to carry out the portion of the program at each data collection platform 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 ( ) 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 in the GOES DCS User Interface Manual, as revised April 1982.

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 data collection platforms for meeting system performance standards.

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

D. Assign priorities for participation in the GOES DCS for scheduling purposes, 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 established operational schedule for collecting data from the user's data collection platforms. Notification will be prior to activation of such schedule changes unless the operator must enact schedule modifications to provide services for emergency warnings. Sudden adverse spacecraft conditions may also preclude the operator from providing the user notification prior to schedule changes. In any event, notification will be made as soon as possible.

V. TERMINATION

This 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 () years unless terminated or extended. Either party may terminate or request amendments by providing notification in writing not less than 90 days in advance. Such amendments will take effect upon the mutual consent of both parties. Failure by the user to use channel allocation for a period of twelve months, unless other arrangements are made in writing, will be considered automatically as notice of termination.

Each party is responsible for ensuring that the provisions of this Agreement are in accord with its program requirements.

Russell Koffler	User

Appendix G

OPERATING AGREEMENT

PROGRAM

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS), of the National Oceanic and Atmospheric Administration (NOAA) [hereinafter referred to as the system operator], and the (platform operator agency) [hereinafter referred to as the platform operator], agree to fulfill the undertakings specified in the operational agreement below. These are in addition to the items contained in the () Program Agreement of ().

I. Name of Agreement.

The program to which this Memorandum applies shall be known as the "(user) GOES Data Collection System Operating Agreement.

II. Purpose of the Agreement.

This Agreement is to implement the () Program.

III. Special Operating Features.

IV. Specific Undertakings on the Part of the Platform Operator.

The platform operator shall:

A. Register the platform by providing the system operator a list of the platform operator's Data Collection Platforms showing the type (self-timed, interrogate, random), where each is to be located, and which platforms are equipped with emergency alarm provisions. This list should be updated as required.

B. Provide the system operator notification prior to Data Collection Platform turn-on and relocation.

C. Provide the system operator with the data type, data format, and message load planned for each Data Collection Platform.

D. Operate and maintain the Data Collection Platforms in conformance with equipment performance standards as specified by the operator in: National Earth Satellite Service () as revised November 1981.

E. Operate and maintain the necessary facilities for receipt of collected data.

F. Provide periodic reports, upon request from the operator, on the present operating techniques used with the DCP's and other items of the ground system.

V. Specific Undertakings on the Part of the System Operator.

The system 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 platform operator's Data Collection Platforms for meeting system performance standards.

C. Notify the platform operator by the most expeditious means available whenever NESDIS system monitoring indicates the platform operator's Data Collection Platform is performing outside system specifications or is inoperative.

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

1. Disaster Warning
2. Operationa
3. Experimental

E. Notify the platform operator of modifications to the established operational schedule for collecting data from the platform operator's Data Collection Platforms. Notification will be prior to activation of such schedule

changes unless the system operator must enact schedule modifications to provide services for emergency warnings. Sudden adverse spacecraft conditions may also preclude the system operator from providing the platform operator notification prior to schedule changes. In any event, notification will be made as soon as possible.

VI. Termination.

This Operational Agreement shall enter into force upon signature by both parties. The Agreement shall remain in force for up to () years unless terminated either at the election of the platform operator or the system 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 twelve months, unless other arrangements are made in writing, will be considered automatically as notice by the platform operator of termination.

Each party is responsible for ensuring that the provisions of this Agreement are in accord with its program requirements. Amendments may be originated by any of the signatory parties. Such amendments will take effect upon the mutual consent of all parties.

NESDIS Signature	Date	User Signature	Date

Appendix H

GOES DCS

DIRECT READOUT STATION MANUFACTURERS

Synergetics International, Inc.
P.O. Box E
6330 Gunpark Drive
Boulder, Colorado 80306
Telephone: (303) 530-2020
Contact: Mr. M. Sharkey

The Sutron Corporation
11150 Main Street
Suite 501
Fairfax, Virginia 22030
Telephone: (703) 591-8010
Contact: Mr. D. Preble

Appendix I

GOES/DCS CERTIFIED DCPRS MFG. LIST

NAME	MODEL	TYPE*	DATE CERTIFIED
Bristol Aerospace Limited Winnipeg, Manitoba Canada Rep: H. C. Johnson (204) 755-8331	695-07	S/T	04/01/77
	696-07	S/T	09/27/79
HANDAR 1380 Borregas Avenue Sunnyvale, CA 94086 Rep: D. Throne (408) 734-9640	520A	S/T	02/17/77
	521A	S/T	
	522A	S/T	11/11/77
	523A	S/T	06/06/79
	524A or 530A	S/T	06/06/79
	524A(R/R & 524B	S/T & R/R	06/15/81
	540A & 541A	S/T	09/01/81
	560(S/N's 101, 850-859)	S/T ONLY	09/01/81
	560A	S/T & R/R	04/24/82
LaBarge Inc., Electronic Div. P.O. Box 926 Tulsa, OK 74101 Tech. Rep: H. Selman (918) 496-7228 Sales Rep: G. Conover (918) 496-7200	DCP-1287	Int.	02/03/77
	CDCP (Conv.)	S/T	11/25/75
	ADCP-1289	S/T & R/R**	02/26/81 04/28/81
Magnavox 1313 Production Road Fort Wayne, IN 46808 Rep: T. Major (219) 429-5344	706171-801	Buoy	02/26/76
	706068-803	Int.	02/26/76
	706068-804	S/T	02/26/76
	301R	Receiver	03/22/78
	302-10	S/T	06/02/82
NASA Lewis Research Center 21000 Brookpark Road Cleveland, OH 44135 Rep: J. Bagwell (216) 433-4000	CF638000-2	Elect. Unit	11/21/77
	CF636403	Pwr. Supply S/T	11/21/77
The Sutron Corporation 11150 Main Street Fairfax, VA 22030 Rep: D. Preble (703) 591-8910	8004	R/R** & S/T	06/24/80
	8004-B	R/R & S/T	10/16/81
	8004-C	R/R & S/T	05/25/82
Data Ware Development Inc. 4204 Sorrento Valley Blvd. San Diego, CA 92121 Rep: Dr. Robert Means (714) 453-7660	WRANSAC (Buoy)	S/T	04/20/82

Synergetics International Inc. P.O. Box E 6330 Gunpark Dr. Boulder, CO 80306 Rep: M. Olson (303) 530-2020	3401A/3421A	S/T & R/R	03/10/82
True Time Instruments 3243 Santa Rosa Avenue Santa Rosa, CA 95101 Rep: J. Van Groos (707) 528-1230	Test Equipment for DCP's		

* Self-timed (S/T); Interrogate (Int.); and Random Reporting (R/R)

** Not certified for Standard Data Format (Specification S23.012, March 20, 1981 or newer)

NOAA SCIENTIFIC AND TECHNICAL PUBLICATIONS

The National Oceanic and Atmospheric Administration was established as part of the Department of Commerce on October 3, 1970. The mission responsibilities of NOAA are to assess the socioeconomic impact of natural and technological changes in the environment and to monitor and predict the state of the solid Earth, the oceans and their living resources, the atmosphere, and the space environment of the Earth.

The major components of NOAA regularly produce various types of scientific and technical information in the following kinds of publications:

PROFESSIONAL PAPERS—Important definitive research results, major techniques, and special investigations.

CONTRACT AND GRANT REPORTS—Reports prepared by contractors or grantees under NOAA sponsorship.

ATLAS—Presentation of analyzed data generally in the form of maps showing distribution of rainfall, chemical and physical conditions of oceans and atmosphere, distribution of fishes and marine mammals, ionospheric conditions, etc.

TECHNICAL SERVICE PUBLICATIONS—Reports containing data, observations, instructions, etc. A partial listing includes data serials; prediction and outlook periodicals; technical manuals, training papers, planning reports, and information serials; and miscellaneous technical publications.

TECHNICAL REPORTS—Journal quality with extensive details, mathematical developments, or data listings.

TECHNICAL MEMORANDUMS—Reports of preliminary, partial, or negative research or technology results, interim instructions, and the like.

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Rockville, MD 20852

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