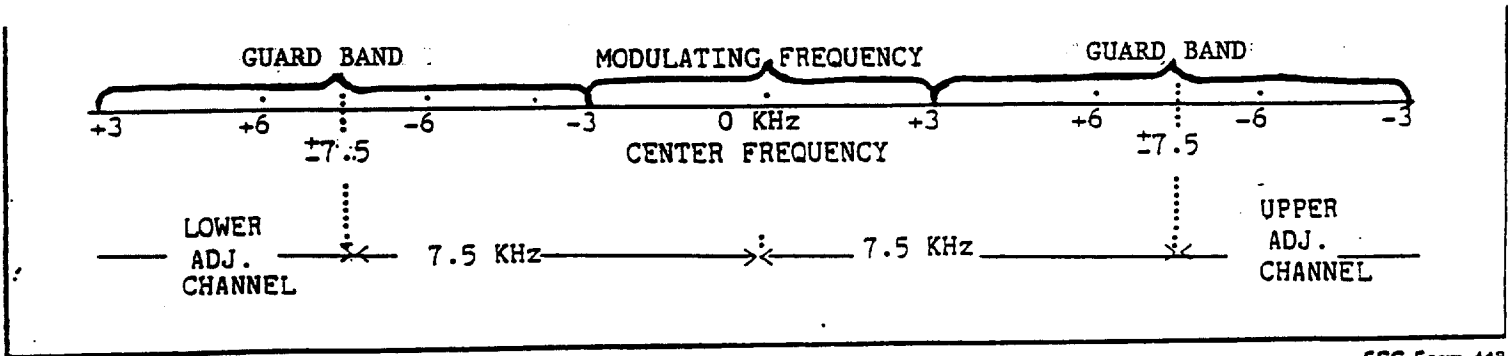


EXHIBIT 1

How Necessary Bandwidth Was Determined



DESCRIPTION OF PROJECT

This project is an expansion of 20 platforms to the existing 29 operational platforms, the City of Colorado Springs has installed in 1986. The platforms are solar powered UHF transmitters, receivers, with sensors and logic control units in a coordinated package.

The platforms have telemetering equipment to measure such parameters as precipitation, temperature, stream flow, and other meteorological and hydrological data. Information gathered is transmitted via an UHF radio up-link to a GOES (Geophysical Orbiting Environmental Satellite) satellite. From the GOES satellite, the information is transmitted via a microwave downlink to earth stations located around the world.

The information gathered is then processed by computers belonging to various entities. The information is not encrypted and is available to any person desiring it.

The information gathered is used for such activities as weather research, watershed management, environmental monitoring, flood warning and prediction, and dam safety, to name but a few.

The goal of this project is to advance the art of Mountain Watershed Management, by using environmental platforms, satellites, and powerful computers, to gather, process, and analyze data. The result in years to come will be more efficient watershed management, greater public safety, and less environmental impact.

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 City of Colorado Springs, Colorado Springs Utilities Water Resources Division, the provider of the Data Collection Platforms and the user of the data collected [the user] have agreed as follows:

- A. This Memorandum of Agreement applies to the City of Colorado Springs GOES Data Collection System Program pursuant to which hydrometeorological data will be acquired from several sites in the central Colorado mountains that will be used by the Water Resources Division of Colorado Springs Utilities.

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 radio frequency band 401.7 to 402.1 MHz as an up-link and the radio frequency band 468.750 to 468.950 MHz as a down-link 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 up-link 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 service.

- 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 form NESDIS to other interested parties as appropriate.
- G. Data collection platforms which the user plans to employ as part of the GOES DCS must be type certified by the operator before deployment.
- H. In consultation with the user, the operator will establish the collection times and message 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 transmission.
- J. NESDIS shall not be liable for any damage or injury brought about by the use of the GOES DCS.

III. SPECIFIC UNDERTAKING ON THE PART OF THE USER

A. The user shall:

- 1. 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.
- 2. Coordinate all transmissions from the data collection platforms to the GOES spacecraft with the operator prior to such transmission.
- 3. Provide the operator notification prior to data collection platform relocation.
- 4. Provide the personnel, funds, and equipment necessary to support 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 Self-Time and Random Reporting Data Collection Platform Radio Set Certification Specifications, as revised November 1988.

5. 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. After connection has been made, the collected operator in the GOES DCS User Interface Manual, as revised July 1984.
5. Provide periodic reports, upon request from the operator, on the present application of the user's DCS data.

IV. SPECIFIC UNDERTAKING ON THE PART OF THE OPERATOR

A. The operator shall:

1. Provide and operate the GOES spacecraft and the NESDIS ground facilities for receiving data collected from the satellite.
2. Provide telemetry reduction sufficient to monitor the user's data collection platforms for meeting system performance standards.
3. 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.
4. 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.
 - a) Disaster Warning
 - b) Operational
 - c) Experimental
5. 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 or ground system saturation 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

- A. 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 ten years unless amended and/or extended. Either party may terminate or request amendments by providing notification in writing not less than 90 days in advance or sooner under the conditions described in Section II D. Such amendments will take effect upon the mutual consent of both parties. Failure by the user to 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.