

A Data Center for the Earth Resources Satellite

by

H.M. Gurk, C.R. Smith and P. Wood  
to be presented at

WINCON/IEEE, February 13, 1969, Los Angeles, California

in the session on  
"Space Observation of Earth Resources"

I. Introduction

Over the past four years there has been a great deal of study by NASA, the Departments of Interior and Agriculture, and by various academic and industrial organizations on the feasibility and applications of remote sensing of the Earth's resources from an orbiting satellite. In September of 1966, the Secretary of the Interior, Stewart Udall, proposed the concept of an Earth Resources Observation Satellite (EROS) to obtain data on a regular basis for use in geology, geography, cartography, hydrology, agriculture, oceanography and many other fields of interest. To develop the required technology for earth resources and to test it in space experiments, NASA is now investigating the Earth Resources Technology Satellite (ERTS).

The data obtained by both of these satellites will be used by many different users from different organizations. This is different from some other technology satellites and even some applications satellites where the data can be directed only to a small number of principal investigators or principal using agencies. Hence, the importance of an adequate ground system must be recognized so that

all users can be rapidly informed of the existence of the data and provided with reproduction, data handling, data processing and dissemination services to aid them in their use of the data.

The ground system must perform its functions and provide an integrated data flow on a variety of data (Figure 1). These include:

- Commands for satellite control
- Raw data collected by the satellite
- Processed data in various forms (including catalogs of what has been collected)
- Requests by users for data

The facilities required to handle this data may take several forms, but must include ground stations for sending commands to and acquiring data from the satellites; an operations control activity to set priorities on satellite usage and to generate the commands; data handling and processing centers; and the users themselves. The initial Earth Resources Satellites are expected to use existing NASA STADAN ground stations. Thus the new facilities of the Earth Resources Ground Data Handling System would consist of the data handling and processing centers and the operations control activity. Initially, it is anticipated that the users would perform all the analytic and interpretive functions on the data and any special processing to aid in these operations. The Earth Resources Ground System would provide the data handling and initial processing to get the data to the users. Such an operation takes advantage of current user capabilities. As the system evolves, however, special centers would be set up to provide particular techniques of processing tools desired by many

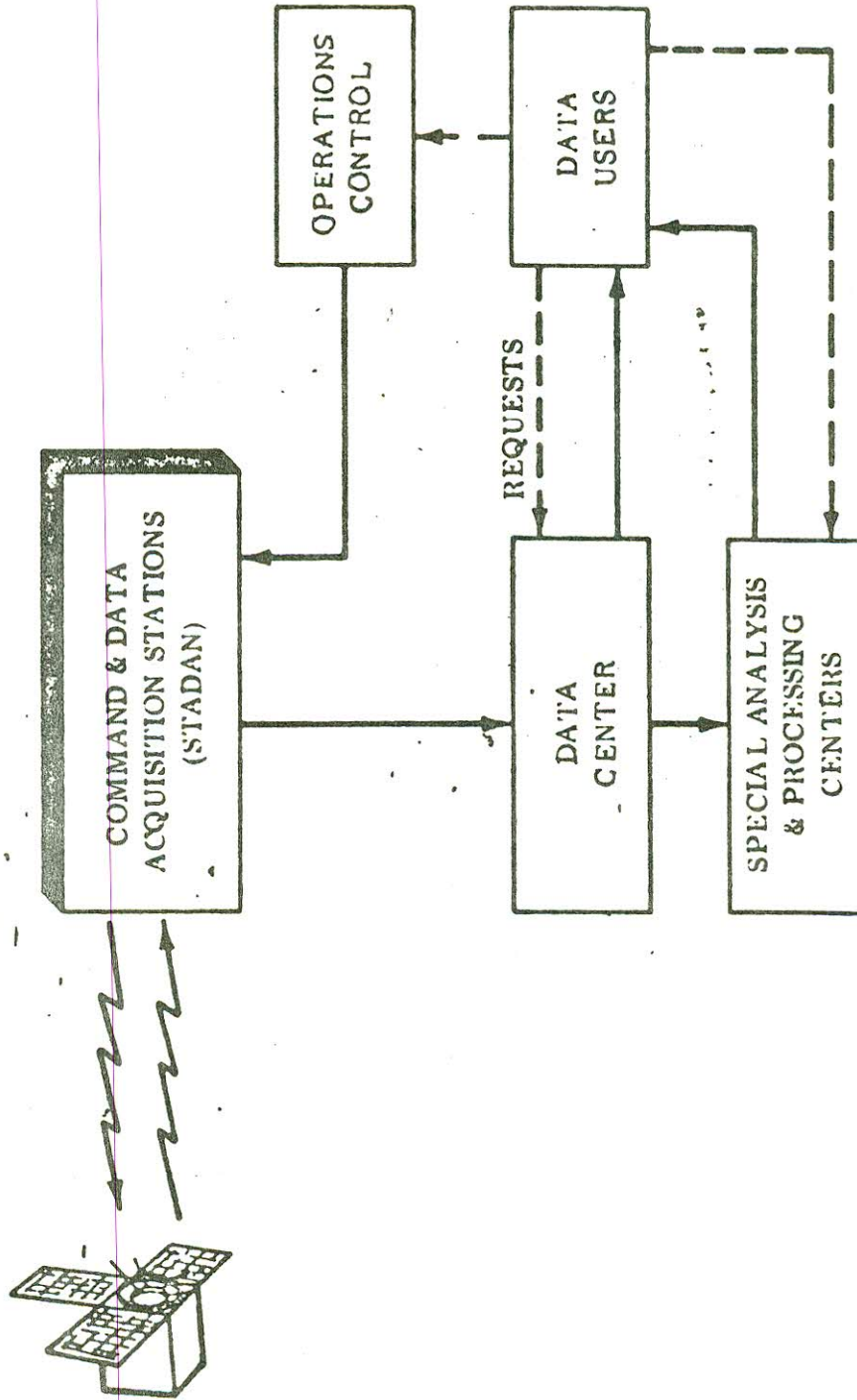


Figure 1

users to aid them in their use of the data.

This paper describes the first component of such a data handling system, a Data Center to perform the initial processing, reproduction, indexing, storage, retrieval and dissemination of the data for all users. This Center will be the foundation upon which a more complete future system, including automatic data processing, enhancement, and analysis, will be built. The system concept described was developed during a study conducted by RCA for the U.S. Geological Survey under Contract No. 14-08-0001-11430.

## II. System Data Requirements

Earth Resources satellites will carry a variety of sensors in different configurations as the program evolves. Changes in sensor capabilities, combinations of sensors on a single satellite, and numbers of satellites simultaneously in use will affect the ground data handling system. Thus, planning for the initial ground system has to take into account both the likeliest kinds of data to be collected on early flights and the need to be able to expand its capabilities in the future to handle other types and volumes of data. Although the complete payload for the first Earth Resources Satellites is not fixed, it is likely that the spacecraft will carry sensors to take pictures of the earth in several spectral bands in the visible and photographic infra-red and also a data relay system to read out data collected by ground based sensors such as hydrology stations. For the data handling study, therefore, it was assumed

