

THE NATIONAL AERONAUTICS AND SPACE Administration,
AND THE U.S. GEOLOGICAL SURVEY

MANAGEMENT PLAN FOR THE LANDSAT PROGRAM

December 1, 1999

I. Introduction

The Landsat Program benefits a broad community, including federal, state, and local governments, global change science, academia, and the private sector. The National Aeronautics and Space Administration (NASA), and the U.S. Geological Survey (USGS) of the Department of the Interior (DOI) acknowledge that the Landsat Program provides a unique capability. The agencies will cooperate in the continuation of the Landsat Program, including development and operation of the Landsat-7 satellite and its ground system and including planning and other preparations for continuing the acquisition and distribution of Landsat-type data, as required, in the post Landsat-7 era

This plan responds, in part, to direction contained in Section 101 of P.L. 102-555, The Land Remote Sensing Policy Act of 1992, Presidential Decision Directive (PDD) PDD/NSTC-3 of May 5, 1994, and the " Proposed New Landsat-7 Operations Agreement" signed by NASA, the National Oceanic and Atmospheric Administration, and the USGS on November 18, 1998. The plan outlines an integrated approach to the development, management, operation, and maintenance of a restructured Landsat Program, responsive to Landsat user data needs, into the next century.

II. Concept

NASA will manage development of the Landsat-7 spacecraft, instrument, and ground system. The USGS will be responsible for spacecraft and ground system operations. The USGS will maintain the national archive of Landsat data, distribute data to users, and administer, on behalf of the U.S. Government (USG), Landsat-7 data acquisition by non-USG ground stations. Each agency will assume management and funding responsibilities outlined in this plan.

III. Program Objectives

The program will pursue the following objectives:

1. Acquire, launch, and operate a Landsat-7 system which, at a minimum, is functionally equivalent to Landsat-6;
2. Provide data sufficiently consistent in acquisition geometry, spatial resolution, calibration, coverage characteristics, and spatial characteristics, with previous Landsat data to meet requirements for global change research and other uses;
3. Maintain an archive of existing and future LANDSAT type data;
4. Compile and refresh periodically a global archive of substantially cloud-free, sunlit land mass (including coastal) Landsat-7 scenes;
5. Distribute Landsat-7 data from the U.S. archive to all users at the cost of fulfilling user requests;
6. Evaluate the need for, and alternative means of, implementing satellite and ground systems improvements following Landsat-7. This will include evaluation of potential changes in program management, funding responsibilities, data management and utilization, system configuration and operational concepts, as well as use of advanced technologies to improve performance, maintain data continuity, and reduce cost.

IV. Program Management

Organizational relationships are depicted in Figure 1. Public Law 102-555 established the Landsat Program Management (LPM) as the top-level entity to integrate the efforts of the agencies involved in the Landsat Program at the level of Agency Administrator and Department Secretary. The LPM comprises NASA and the USGS. Under the authority of the LPM, a Landsat Coordinating Group (LCG) will be responsible for implementing a joint Management Plan and overseeing interagency matters, including coordination of budget, policy, and program management, and resolution of issues pertaining thereto. The LCG will be chaired by NASA until normal mission operations of Landsat-7 begin, jointly chaired by NASA and the USGS during the period of shared funding, and chaired by the USGS after all Landsat-7 operations are turned over to the USGS. During the period of shared funding, decision authority regarding the Mission Operations Center and spacecraft health and safety rests with NASA/Goddard Space Flight Center (GSFC); decision authority regarding the Earth Resources Observation Systems (EROS) Data Center (EDC) and international cooperators rests with USGS/EDC. Each party will seek the concurrence of the other when possible, and disputes will be brought to the LCG for resolution. The LCG comprises the senior agency officials designated as signers of this management plan.

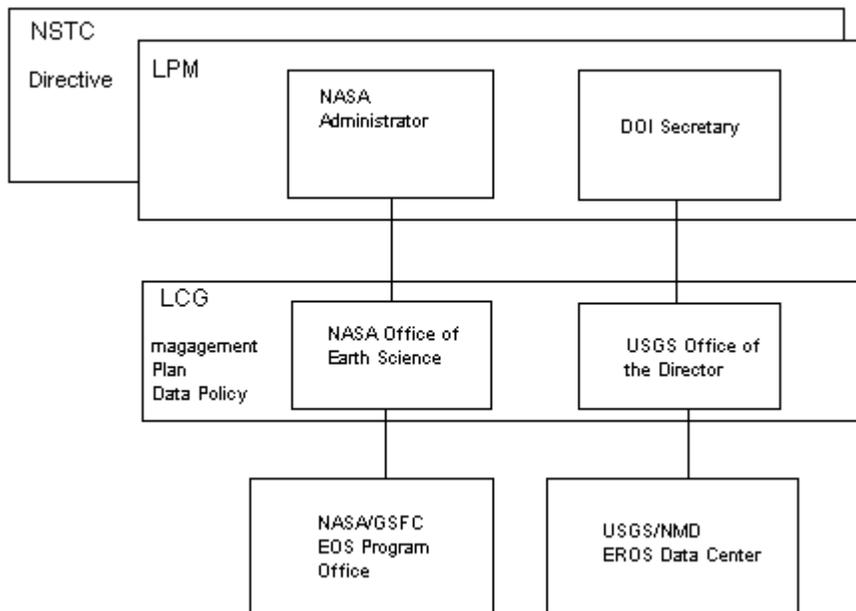


Fig 1. Landsat-7 Program Organizations

The NASA Associate Administrator for Earth Science will be the senior agency official responsible for NASA program oversight and issue resolution. The NASA portion of the overall program will be administered under the Director, Program Planning and Development Division, Office of Earth Science. Technical and contract management will be performed by the EOS-G Program Office at GSFC.

The USGS Director will be the senior agency official responsible for USGS program oversight and issue resolution. The USGS portion of the program will be administered under the Chief, National Mapping Division. Satellite operations, ground segment operations, and the national archive functions will be conducted at, or through, USGS/EDC.

V. Agency Responsibilities

1. NASA:

- a. Manage Landsat-7 system development;
- b. Develop, integrate, and test the spacecraft, Enhanced Thematic Mapper-Plus (ETM+) instrument, launch vehicle services, and ground system for Landsat-7;
- c. Perform associated systems engineering and technical management functions;
- d. Launch the Landsat-7 satellite (integrated spacecraft and ETM+), perform on-orbit checkout and ground system activation and calibration, and turn the Landsat-7 system over to the USGS for operations;
- e. Operate the Landsat-7 satellite through the end of fiscal year (FY) 2000, then transfer flight operations to the USGS;
- f. Provide access to NASA's Consolidated Space Operations Contractor to permit the continuation of operations-related services and acquisition of other operations-related services if needed;
- g. Support Landsat-7 system operations through the EOS-G Program Office and the Landsat Science Office, which performs instrument calibration and data quality assessments;
- h. Plan for the continuity of land remote sensing data, including promotion of research into advanced sensor technologies and dialog with industry on potential commercial data purchase arrangements;
- i. Participate in NASA/USGS Landsat program management and technical reviews and other activities as required.

2. USGS:

- a. Participate in ground system development;
- b. Support spacecraft/ground system integration and test;
- c. Manage the spacecraft and ground system operations and maintenance for the life of the spacecraft, including mission management and command and control of the spacecraft, data capture and systematic data processing, assuring systems performance and data quality, supporting instrument calibration, and distributing data to all users at no more than the cost of fulfilling user requests.
- d. Facilitate commercial application of Landsat-7 data;
- e. Maintain the national archive of Landsat-7 data;
- f. Seek international cooperation and utilization of Landsat-7 data and arrange agreements with international cooperators for acquisition and distribution of Landsat-7 data;
- g. Plan for the continuity of land remote sensing data, including promotion of research into advanced sensor technologies and dialog with industry on potential commercial data purchase arrangements;
- h. Participate in NASA/USGS Landsat program management and technical reviews and other activities as required.

VI. Funding Responsibilities

1. NASA is responsible for Landsat-7 development and operations through FY 2000.
2. USGS is responsible for:
 - a. Landsat-7 operations at EDC and mission management functions beginning in FY 1999.
 - b. Landsat-7 flight operations beginning in FY 2001.
 - c. Reimbursing NASA for any needed engineering and technical support beginning in FY 2001.
3. Each agency's obligations are contingent on the availability of appropriated funds.
4. Any requirements driven by desired improvements, increases in capability, or operations support will be funded by the requesting agency. If it is agreed that an improvement benefits the interests of more than one of the participating agencies, it will be funded by a mutually acceptable sharing arrangement approved by the respective senior agency officials.
5. Agency funding and management responsibilities for subsequent Landsat systems will be the subject of amendments to this agreement.

VII. Other Considerations

1. System Requirements: Top level requirements for the Landsat-7 system are provided as Attachment 1. The LCG is the change control authority for these requirements.
2. Data Policy: The Landsat Data Policy Plan will be developed by NASA and the USGS in accordance with the provisions of P.L. 102-55-5.
3. Implementing Arrangements: NASA and the USGS will develop working level interagency implementing arrangements to carry out their respective responsibilities outlined in this plan.
4. Liability and Risk of Loss: Each party agrees to assume liability for its own risks associated with activities undertaken in this agreement.
5. Duration and Amendments: This management plan becomes effective when the last signature is affixed by the authorized representative. Notification by one of the signatories can cause renegotiation or cancellation of this plan. It will remain in effect until terminated by such notification,

APPROVED:

Dr. Charles Groat
Director, U.S. Geological Survey

Date

Dr. Ghassem Asrar
Associate Administrator for Earth Science
National Aeronautics and Space Administration

Date

ATTACHMENT 1

LANDSAT-7 SYSTEM LEVEL REQUIREMENTS

1. The Landsat-7 system shall operate in a sun-synchronous orbit with an orbit track repeat cycle of 16 days completing 233 orbits. The ground track of the Landsat-7 shall be maintained such that the Landsat-7 will fly **over** the Landsat Worldwide Reference System to an accuracy of 5 km at the Equator. This orbit shall have a nominal descending equatorial crossing time of 10:00 am +/- 15 minutes.
2. The Landsat-7 system shall have on-board data storage with capacity to support the global archive data acquisition requirements when Landsat-7 is out of view of the U.S. Landsat-7 Ground Station.
3. The Landsat-7 system shall use CCSDS-compatible formats for all forward and return links.
4. The Landsat-7 system shall provide wideband communications at X-Band frequencies at 150 Mbps.
5. The Landsat-7 system operations, housekeeping and safety functions shall be supported by S-band resources.
6. The Landsat-7 system shall carry an Enhanced Thematic Mapper Plus (ETM+) as its primary payload.
 - 6.1 The ETM+ shall be a multispectral sensor capable of providing land surface imagery for six visible, near infrared and short-wave infrared bands with 30m (nadir) spatial resolution, for one thermal infrared spectral band with 60m (nadir) spatial resolution, and for one panchromatic spectral band with 15m (nadir) spatial resolution over a 183km swath centered on nadir.
7. The Landsat-7 system shall have the capability to capture, process, archive and distribute Landsat-7 ETM+ data.
8. The Landsat-7 system shall provide for receipt, capture and process to level OR the equivalent of 250 ETM+ scenes per day in response to users requests.
9. The Landsat-7 system shall provide the capability of making available 100 ETM+ scene products per day (Level OR, IR and/or I G).
10. The Landsat-7 system shall provide archiving and distribution of ETM+ data through the Land Processes Distributed Active Archive Center.
11. The Landsat-7 system shall support acquisition of housekeeping and payload data and assessment of data quality.
12. The Landsat-7 system shall have. capability to provide ETM+ data to a network of non-USGS ground stations.