

## EXECUTIVE SUMMARY

# Landsat Data Continuity Mission Workshop

RAYMOND A. BYRNES

### Background

The Land Remote Sensing Policy Act of 1992 cites four options to be considered by Landsat Program Management for a successor to the Landsat 7 Mission. The options are to have a Landsat Data Continuity Mission (LDCM) based on funding and management by the private sector, an international consortium, the U.S. government, or a cooperative government/private sector effort. The law goes on to state a preference for the private sector option. The National Aeronautics and Space Administration (NASA) and the U.S. Geological Survey (USGS), as partners in Landsat Program Management, co-sponsored a highly successful LDCM Workshop held at USGS headquarters in Reston, Virginia on January 9-10, 2001. The purpose of the workshop was (1) to bring together key segments of the land remote sensing community to review and discuss a draft LDCM data specification that would apply to any of the mission funding and management options identified above and (2) to have open-forum exchanges on the concept of an LDCM data buy, an approach designed to maximize private-sector LDCM participation.

Approximately 200 registrants included (1) **earth scientists** from organizations such as the University of Maryland, Michigan State University, the University of Minnesota, the University of Virginia, the University of Wisconsin, the University of Arizona, Penn State University, the University of Colorado, USDA Forest Service, EPA, and USAID; (2) **commercial data providers** from organizations such as EARTHWATCH, Space Imaging, ORBIMAGE, SPOT, and Resource 21 in addition to po-

tential LDCM subcontractors such as Lockheed Martin, TRW, Northrop Grumman, Spectrum Astro, MacDonald Dettwiler, ITT Industries, Raytheon, Boeing, and Ball Aerospace; (3) **data distributors and value-added resellers** (distributors/VARS) from organizations such as EARTHSAT, IMAGELINKS, EURIMAGE, Metapath Software, ESRI, ERDAS, Earth Search Sciences, and Farmland Industries; and (4) **data users** from a broad spectrum of non-profit, government, and academic organizations such as the World Resources Institute, OhioView, the National States Geographic Information Council, USDA, U.S. Army Topographic Engineering Center, U.S. Department of State, U.S. Department of Transportation, Texas Natural Resources Information System, University of North Dakota, University of Wisconsin, George Washington University, Austin Peay State University, and the National Imagery and Mapping Agency.

The workshop format included panel presentations from representatives of the four categories highlighted above, with each set of presentations followed by interchanges with the audience. Panelists were asked to prepare their remarks based on questions provided before the workshop by the planning committee. Some panelists opened with illustrated presentations (posted on the LDCM website at <http://ldcm.usgs.gov/>). After one and a half days of general sessions, the audience adjourned and panelists reconvened in separate sessions to identify key issues or recommendations that had emerged during the workshop (see full report for panel notes).

### General Findings

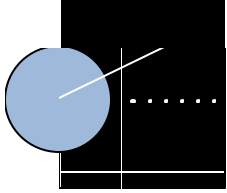
Although legislation identifies a privately funded and managed system as the preferred option for a successor to Landsat 7, workshop participants, especially those from the scientific, distributor/VAR, and end-user categories, emphasized the public good of the Landsat Program for science, education, resource management, and commercial/economic development. Consensus among commercial data providers indicated that there is an insufficient market to justify the private investment that would be required to fly a commercial Landsat-like system. Various panelists and audience members characterized Landsat 7 as providing "entry-level" data that, in turn, creates user interest in higher-resolution data.

Scientists, distributors/VARS, and end users repeatedly stated that an open, unrestrictive data policy, similar to the Landsat 7 policy, is essential for a data continuity mission. Data providers voiced no objection to the current data policy, having commented previously on the limited commercial value of Landsat-like (30-meter resolution) data.

The concept of pricing Landsat 7 data — as required by public law — at the cost of fulfilling user requests was endorsed for a continuity mission. However, several users complained that this policy results in costs that are still too high for global research, other large-scale applications, state and local governments, and other users with limited resources.

Data providers and the audience in general indicated a strong sense of urgency to move forward with the

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next mission in order to avoid a data gap if Landsat 7, launched in April 1999, does not exceed its five-year design lifetime. NASA and the USGS were asked to issue a request for proposals (RFP) to potential data providers as soon as possible.

Several Federal and State agencies stated that Landsat data has, over the years, become a baseline requirement for their operations. Various workshop participants pointed out that those agencies must become more involved in planning, supporting, and promoting the LDCM.

Observations were made throughout the workshop that expensive, single-satellite "gap-filler" missions such as Landsat 7 endanger long-term data continuity. Suggestions were made that costs per mission could be reduced through purchasing or planning for data acquisitions in 10-year or longer segments that, in turn, would require increased system redundancy or multiple spacecraft (thus assuring data continuity). Such a commitment would require a long-term U.S. strategy for land remote sensing, a development that was called for by several workshop participants.

To ensure future collection of, and access to, global Landsat-like data sets, emphasis was placed on continued Landsat Program Management cooperation with international ground receiving stations. Positive comments were also made on current and his-

toric aspects of such international cooperation in terms of U.S. foreign policy.

## Data Specification Recommendations

A draft LDCM Data Specification was posted on the LDCM website in November 2000 for pre-workshop review and comment, an action that drew several detailed responses which reflected close study of the document. In addition to having the opportunity to discuss the draft "data spec" during the workshop, participants were encouraged to file comments, questions, and recommendations online after the workshop. A second draft, based on written responses and workshop discussion, is to be drawn up in February 2001 and posted on the website in March.

LDCM "data spec" recommendations compiled to date include the following (see full report for more detailed information):

- Retain seasonal global coverage as a primary mission requirement; today's computer systems can handle extremely large data sets, thus enabling regional/global analyses.
- Decrease satellite revisit time; the current 16-day cycle is insufficient for numerous applications.
- Sustain the Landsat 7 system's level of instrument/data calibration, a must for valid scientific applications.
- Add thermal infrared (TIR) band(s).

Note: The heritage TIR band on Landsat 7 was dropped from the first draft strictly as a cost factor.

- Specify the Landsat 4/5/7 worldwide reference system (WRS) path/row ground track; it's already difficult to use that one in conjunction with the Landsat 1-3 WRS grid.
- Specify swath width that will ensure synoptic observations as opposed to a patchwork of small-footprint scenes possibly captured on different dates.
- Clarify the current cloud cover spec; as stated, it's difficult for a potential data provider to meet.

## Next Steps

In addition to the revised LDCM Data Specification mentioned above, a briefing on workshop findings will be presented to Landsat Program Management. The revised "data spec" will be posted for further review on the LDCM website and discussed at upcoming conferences (see <http://www.asprs.org/>). Within the next several months, the LDCM concept will be finalized and followed by a draft RFP. At least one workshop will be held in late 2001 on the draft RFP, to be followed by at least one workshop or pre-proposal conference that will be held in relation to the final RFP to be issued in early 2002.

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*Raymond A. Byrnes*  
USGS Liaison for Satellite Programs