1Supporting Statement A

Current and Future Landsat User Requirements

OMB Control Number 1028-NEW

Terms of Clearance: None.

Justification

1. **Explain the circumstances that make the collection of information necessary. Identify any legal or administrative requirements that necessitate the collection.**

The U.S. Geological Survey's (USGS) Land Remote Sensing (LRS) Program manages the Landsat system and its earth observing imagery. The imagery is collected, processed, archived, and distributed by the Earth Resources and Observation Science (EROS) Center in Sioux Falls, SD. As the provisioner of this imagery, LRS is responsible for the following for Landsat imagery:

1. Ensure data continuity;
2. Be responsive to users and their needs related to Landsat imagery; and
3. Increase the benefits of Landsat.

In order to effectively meet these responsibilities, LRS Program managers must have a comprehensive understanding of the users, uses, and benefits realized by the imagery. Direct input from imagery users allows LRS to effectively tailor provision of the imagery and policies governing the program.

LRS is currently collecting imagery requirements for the next generation of Landsat sensors and satellites to ensure they meet the needs of the greatest number of users. These requirements focus on the specific attributes of the satellite and sensor, such as spatial resolution and frequency of revisit, which contribute directly to the ability of users to optimally carry out their work that uses Landsat. Information collection efforts so far have focused on U.S. Federal government users only and it is unclear whether the requirements of U.S. non-Federal and international users are similar to or different from U.S. Federal users. While there is some data on uses among U.S. non-Federal and international users available, it is out of date and focuses on the broad uses of the imagery, rather than preferences for specific attributes of the imagery that are needed to help guide the design of the next sensor and satellite. Additionally, the number of Landsat users registered with EROS has more than doubled since the launch of Landsat 8 to almost 130,000. This increase indicates there may be a substantial group of new Landsat users now registered with EROS and an even broader range of users than ever before. Collecting requirements information from new and established users and users in a wider variety of application areas is critical to ensuring LRS is responsive to the needs of all Landsat users. Beyond collecting requirements data, in order to assess changes to the benefits of Landsat, LRS must have trend

longitudinal data (not panel longitudinal data) to measure benefits over time. This survey, in conjunction with a previous survey of the same population, will allow that comparison.

This information collection supports the requirements that the USGS ensure that the operation of the Landsat system is responsive to the broad interests of the civilian, national security, commercial, and foreign users of the Landsat system. USGS is also required to ensure the continuity of moderate-resolution data. Specifically, this surveying effort will provide information required by the Land Remote Sensing Policy Act of 1992 (15 USC 5601).

This surveying effort is also promoted by the following regulations, policies and statutes:

- Government Performance and Results Act (GPRA) of 1993 (31 USC 1115)
- Presidential Decision Directive/NSTC-3 (October 16, 2000)

A brief overview of each is provided below:

Land Remote Sensing Policy Act of 1992 (15 USC 5601)
This Act returned the management of the Landsat system to the Federal government. It stresses the importance of the Landsat system, and provides guidance on management of the system and continuity of Landsat data. According to this Act, USGS is responsible for "…ensuring that the operation of the Landsat system is responsive to the broad interests of the civilian, national security, commercial, and foreign users of the Landsat system…" USGS is also required to ensure the continuity of moderate-resolution data.

GPRA of 1993 (31 USC 1115)
This information will be used by USGS to meet Government Performance and Results Act (GPRA) requirements. In particular, GPRA requires that all agencies establish performance indicators and provide annual reports on program performance based on those indicators. For USGS, program goals include meeting the needs of the users of Landsat satellite imagery.

Presidential Decision Directive/NSTC-3 (October 16, 2000)
This amended Directive transfers operations of satellites to the Department of Interior (DOI) and directs DOI, including USGS, to ensure data continuity beyond Landsat 7.

2. Indicate how, by whom, and for what purpose the information is to be used. Except for a new collection, indicate the actual use the agency has made of the information received from the current collection. Be specific. If this collection is a form or a questionnaire, every question needs to be justified.

As manager of the Landsat system, USGS will use this information to more effectively provide imagery that meets users' needs and to determine if benefits provided by Landsat have increased over time, for which they are tasked. It will help them meet their programmatic requirements of overseeing Landsat operations and effectively distributing the imagery through EROS. Specifically, USGS will be able to use this information to guide the development of future Landsat satellites to meet the needs of a greater diversity of users. They will also be able to compare valuation results to a previous survey to see how the benefits of Landsat to users have

changed over time.

This collection contains the full survey and a short non-response survey that will both be administered online. For both surveys, respondents will receive instructions and answer a series of questions. Although the main survey contains many questions, online survey software with branching and skipping capabilities will be used; in this way respondents will only answer questions relevant to them.

There are four sections in the survey: (1) use of Landsat imagery, (2) Landsat features, (3) value of Landsat imagery, and (4) work experience, described below. Individual question justifications are provided in the survey.

Section 1: Use of Landsat Imagery
The first section will identify how Landsat is used in the work of respondents. This information is necessary because it will provide the work context in which user requirements exist. This information will allow USGS to be more responsive to EROS users in providing Landsat imagery and managing the Landsat system. This information will also be helpful to USGS in fulfilling their data continuity requirements by identifying the key uses of the imagery that need to be provided for by USGS. Questions under this category include:

- Use of Landsat for work
- Types of remotely-sensed imagery used (beyond Landsat)
- Distribution of Landsat imagery and Landsat-derived products to other users
- Applications of Landsat imagery
- Environmental parameters derived from Landsat

Section 2: Landsat Features
The second section focuses on user requirements for specific features (attributes) of Landsat imagery, as well as the current use of Landsat imagery and products. This information will be used to guide the development of future sensors and satellites, as well as the development of Landsat-derived products, to most effectively meet the needs of the greatest number of users. Questions include:

- Current provision of attributes
- Ideal future provision of attributes and any benefits accruing from improvements in those attributes
- Preferred trade-offs between attribute features
- Interest in future imagery provision options
- Importance of current Landsat products

Section 3: Value of Landsat Imagery
The third section includes two sets of questions concerning the value of Landsat imagery. The first focuses on the value of Landsat imagery in general. Understanding the value of the imagery is critical information needed for USGS to provide data continuity, be responsive to their users, and increase the benefits of the imagery, as described in #1 above. In the event of a break in data continuity (e.g., the current satellites cease operation before a new one is launched), this information will help guide USGS in selecting replacement imagery by establishing a reasonable

expense for imagery to ensure data continuity. Willingness to pay data is essential for USGS to understand how much demand there would be by users for alternative imagery as a function of the price that USGS would have to pay for alternative imagery. The willingness to pay for imagery, if Landsat imagery were not available, is a contingent valuation question. Contingent Valuation Method (CVM) will be used to determine how much users would pay for substitution imagery if Landsat imagery were not available. The method is recommended for use by federal agencies performing benefit-cost analysis (U.S. Water Resources Council, 1983). As suggested by the National Oceanic and Atmospheric Administration (NOAA) panel on contingent valuation (Arrow, et al., 1993), a dichotomous choice format question will be asked.

A second valuation question will be asked regarding analysis-ready Landsat data (ARD). This is a product which USGS is considering producing for users but it is unclear what the value of such a product would be. In order to determine whether producing ARD will result in a net benefit for users and society as a whole, they will be asked how much they would be willing to pay for it. This question will also allow USGS to identify user groups who would benefit from ARD and to use their requirements to help guide the development of ARD, if it is produced.

Section 4: Work experience
The final category of questions will allow the respondents to indicate their employment sector and how long they have been using remotely sensed imagery. This information will allow comparisons to be made between users in different sectors and between more and less experienced users to determine if these characteristics have an impact on desired requirements and received benefits.

3. **Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses, and the basis for the decision for adopting this means of collection. Also describe any consideration of using information technology to reduce burden and specifically how this collection meets GPEA requirements.**

The surveys will be administered online. All contact with potential respondents will be by email. Each email will contain a unique link which will allow a respondent to reach the survey in one click. Using the online survey mode allows for skipping and branching logic to ensure respondents are asked only questions which apply to them. The ease of accessing the survey and the avoidance of inapplicable questions minimizes burden on respondents. This approach also meets GPEA requirements to provide an option to submit information electronically to Federal agencies.

4. **Describe efforts to identify duplication. Show specifically why any similar information already available cannot be used or modified for use for the purposes described in Item 2 above.**

Comprehensive current and future Landsat requirements information for users outside of the U.S.

Federal government is not available. Past surveys have shown that the majority of Landsat users registered with EROS are not Federal users, which means that the requirements for many users have not been collected. Data on the benefits of Landsat has been collected in earlier surveys; however, the last available data is from 2012 and is now out of date. Landsat 8 had not yet been launched when this data was collected. Landsat 8 has now been in operation for more than four years, which has provided sufficient time to allow all users the opportunity to use it and derive benefits from it. Additionally, the continuous growth of the use of Landsat, both in number of users and in number of scenes distributed, indicates that the benefits may have changed as new uses have arisen and users have begun using it.

5. If the collection of information impacts small businesses or other small entities, describe any methods used to minimize burden.

This collection is not expected to have a significant impact on small businesses or small entities. We have attempted to minimize the burden to all respondents by developing an online survey.

6. Describe the consequence to Federal program or policy activities if the collection is not conducted or is conducted less frequently, as well as any technical or legal obstacles to reducing burden.

In the absence of this information collection, the USGS LRS Program will not have evidence-based information from users to inform their obligations for managing the Landsat system and its imagery. Namely, they will be less effective at ensuring data continuity, being responsive to users and their needs, and understanding the benefits of the imagery. These obligations are set forth in the Land Remote Sensing Policy Act, GPRA, and Presidential Decision Directive/NSTC-3 (described in #1 above). Because there is little information about the requirements of users outside the U.S. Federal government and there has been substantial growth in the number of users registered with EROS, is not clearly known how to best provide future products and services for all of these users.

7. Explain any special circumstances that would cause an information collection to be conducted in a manner:

- *** requiring respondents to report information to the agency more often than quarterly;**
- *** requiring respondents to prepare a written response to a collection of information in fewer than 30 days after receipt of it;**
- *** requiring respondents to submit more than an original and two copies of any document;**
- *** requiring respondents to retain records, other than health, medical, government contract, grant-in-aid, or tax records, for more than three years;**
- *** in connection with a statistical survey that is not designed to produce valid and reliable results that can be generalized to the universe of study;**
- *** requiring the use of a statistical data classification that has not been reviewed and approved by OMB;**
- *** that includes a pledge of confidentiality that is not supported by authority**

established in statute or regulation, that is not supported by disclosure and data security policies that are consistent with the pledge, or which unnecessarily impedes sharing of data with other agencies for compatible confidential use; or

* **requiring respondents to submit proprietary trade secrets, or other confidential information, unless the agency can demonstrate that it has instituted procedures to protect the information's confidentiality to the extent permitted by law.**

This request contains no special circumstances.

8. If applicable, provide a copy and identify the date and page number of publication in the Federal Register of the agency's notice, required by 5 CFR 1320.8(d), soliciting comments on the information collection prior to submission to OMB. Summarize public comments received in response to that notice and in response to the PRA statement associated with the collection over the past three years, and describe actions taken by the agency in response to these comments. Specifically address comments received on cost and hour burden.

Describe efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported.

Consultation with representatives of those from whom information is to be obtained or those who must compile records should occur at least once every three years — even if the collection of information activity is the same as in prior periods. There may be circumstances that may preclude consultation in a specific situation. These circumstances should be explained.

The 60-day FRN was published 06/19/2017 at 82 FR 27867. No comments were received for this notice.

A pretest of the survey will be conducted with Federal Landsat users in order to ensure there are no technical issues with the online administration of the survey, the intentions of all questions and responses are clear, and all language is easily understood. We did not complete a focus group. We have several resources that were used to develop the survey. The following list comprises previous Landsat studies (see below). A pretest will be completed with federal Landsat users. Approximately 800 federal Landsat users will be recruited with an expected response rate of 30% (240 participants). We will recruit the federal Landsat users from the population of registered EROS users.

1. U.S. Department of Interior. U.S. Geological Survey. The Users, Uses, and Value of Landsat and Other Moderate-Resolution Satellite Imagery in the United States – Executive Report, by Miller, HM; Sexton, NR; Koontz L; Loomis J; Koontz SR; Hermans, C. Open-File Report 2011-1031, U.S. Geological Survey. Fort Collins, Colorado, 2011. *https://pubs.usgs.gov/of/2011/1031/pdf/OF11-1031.pdf*
2. U.S. Department of Interior. U.S. Geological Survey. Users, Uses, and Value of

Landsat Satellite Imagery – Results from the 2012 Survey of Users, by Miller, HM; Richardson L; Koontz, SR; Loomis J; Koontz L. Open-File Report 2013-1269, U.S. Geological Survey. Fort Collins, Colorado, 2013. *https://pubs.usgs.gov/of/2013/1269/pdf/of2013-1269.pdf*

3. Researchers at the Land Remote Sensing Program (LRS) also implemented interviews and a survey. Their results helped guide the design of the current survey. *https://remotesensing.usgs.gov/rca-eo/*

9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

There are no payments or gift giving associated with this collection.

10. Describe any assurance of confidentiality provided to respondents and the basis for the assurance in statute, regulation, or agency policy.

For the purposes of confidentiality, respondent email addresses will be used only to track survey completions and will not be associated with survey responses. Once data collection has been concluded, all email addresses will be deleted. Additionally, all information collected on the survey will be analyzed and reported on in aggregate; no data on a single individual will be released.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private. This justification should include the reasons why the agency considers the questions necessary, the specific uses to be made of the information, the explanation to be given to persons from whom the information is requested, and any steps to be taken to obtain their consent.

This collection does not ask for information of a sensitive nature.

12. Provide estimates of the hour burden of the collection of information. The statement should:

- **Indicate the number of respondents, frequency of response, annual hour burden, and an explanation of how the burden was estimated. Unless directed to do so, agencies should not conduct special surveys to obtain information on which to base hour burden estimates. Consultation with a sample (fewer than 10) of potential respondents is desirable. If the hour burden on respondents is expected to vary widely because of differences in activity, size, or complexity, show the range of estimated hour burden, and explain the reasons for the variance. Generally, estimates should not include burden hours for customary and usual business practices.**
- **If this request for approval covers more than one form, provide separate hour burden estimates for each form and aggregate the hour burdens.**
- **Provide estimates of annualized cost to respondents for the hour burdens for**

collections of information, identifying and using appropriate wage rate categories. The cost of contracting out or paying outside parties for information collection activities should not be included here.

Burden estimate is based upon the time to read instructions and to complete a survey. This collection contains two surveys: (1) the full survey and (2) the non-response survey. The second survey will be used to measure the non-response bias and will be administered only to those who do not complete the full survey. This survey contains a small subset of questions from the full survey. We have estimated burden for civilians (general public) for both the full survey and the non-response survey.

The total EROS population of Landsat users (i.e., those who have downloaded Landsat imagery in the last 12 months) is 129,229 (table 1). Of those, 18,264 are U.S. citizens and 110,965 are international citizens. Of the U.S. users, 1,248 are Federal government employees who will not be included in the burden calculation, leaving 17,016 U.S. users and 127,981 users in total. All U.S. users will be contacted since past research has shown U.S. users download the majority of Landsat imagery. However, contacting all international users is not feasible, given time and logistical limitations. A random sample of 18,000 international users (to approximate the total number of U.S. users, not just the U.S. non-Federal users) will be drawn from the population and sent the survey. This leaves a total of 35,016 non-Federal potential respondents.

Table 1. Population and samples sizes for EROS Landsat users for full survey

Landsat users	Total EROS population	U.S. Federal government employees	Total non-Federal EROS population	Total sample drawn	Total non-Federal sample drawn	Expected undeliverable emails	Total potential non-Federal respondents
U.S.	18,264	1,248	17,016	18,264	17,016	1,702	15,314
International	110,965	NA	110,965	18,000	18,000	1,800	16,200
Total	**129,229**	**1,248**	**127,981**	**36,264**	**35,016**	**3,502**	**31,514**

Based on experience with other samples of known populations, we expect a 10% undeliverable rate for both U.S. and international users, reducing the number of potential non-Federal respondents to 31,514 (table 2). This undeliverable rate is expected from a previous Landsat study (see below). Based on the response rate from the 2012 survey, we are assuming a 30% response rate, yielding 9,454 non-Federal respondents. Though this response rate is relatively low, the sample obtained is still far greater than that needed to provide sufficient statistical power to generalize to the population of EROS users and to allow for comparisons between various user groups, such as international and U.S. users. For the non-response survey, we expect a 10% response rate from the remaining 22,060 potential non-Federal respondents, which adds 2,206 respondents to the burden calculation.

1. U.S. Department of Interior. U.S. Geological Survey. Users, Uses, and Value of Landsat Satellite Imagery – Results from the 2012 Survey of Users, by Miller,

HM; Richardson L; Koontz, SR; Loomis J; Koontz L. Open-File Report 2013-1269, U.S. Geological Survey. Fort Collins, Colorado, 2013.

Table 2. Expected undeliverable and response rates for EROS Landsat users for full and non-response surveys

Landsat users	Total non-Federal sample drawn	Expected undeliverable emails	Total potential non-Federal respondents	Expected number of full survey respondents	Total potential non-response survey respondents	Expected number of non-response survey respondents
U.S.	17,016	1,702	15,314	4,594	10,720	1,072
International	18,000	1,800	16,200	4,860	11,340	1,134
Total	**35,016**	**3,502**	**31,514**	**9,454**	**22,060**	**2,206**

Total burden estimate for this collection is 3,335 hours (table 3). This burden is different from that in the 60-day notice due to revised population numbers received from EROS. We estimate an aggregated annual cost to the respondents to be $116,392. The hour cost is based on the Bureau of Labor Statistics News Release USDL-17-0321 of March 17, 2017, "Employer Costs for Employee Compensation – December 2016" (https://www.bls.gov/news.release/archives/ecec_03172017.pdf), for average full compensation per hour including benefits for civilians.

Table 3. Estimated dollar value of annual burden hours for civilians

The completion times across the various potential branches of the survey were averaged. We used the previous three Landsat surveys to estimate the number of users following each branch of the survey. The survey was also pilot tested with approximately 20 participants. The pilot test included timing different branching options, which were incorporated into the completion time estimate**.** For the non-response survey, we used the three previous Landsat surveys to estimate the time to complete the non-response survey. The non-response survey was also pilot tested with approximately 20 participants.

Survey Respondents (civilians)	Annual Number of Responses	Estimated Completion Time per Respondent (minutes)	Total Annual Burden Hours	Dollar Value of Burden Hour Including Benefits	Total Dollar Value of Annual Burden Hours
Full survey	9,454	20	3,151	$34.90	$109,970
Non-response survey	2,206	5	184	$34.90	$6,422
Total	**11,660**		**3,335**		**$116,392**

13. Provide an estimate of the total annual non-hour cost burden to respondents or recordkeepers resulting from the collection of information. (Do not include the cost of

any hour burden already reflected in item 12.)

* **The cost estimate should be split into two components: (a) a total capital and start-up cost component (annualized over its expected useful life) and (b) a total operation and maintenance and purchase of services component. The estimates should take into account costs associated with generating, maintaining, and disclosing or providing the information (including filing fees paid for form processing). Include descriptions of methods used to estimate major cost factors including system and technology acquisition, expected useful life of capital equipment, the discount rate(s), and the time period over which costs will be incurred. Capital and start-up costs include, among other items, preparations for collecting information such as purchasing computers and software; monitoring, sampling, drilling and testing equipment; and record storage facilities.**
* **If cost estimates are expected to vary widely, agencies should present ranges of cost burdens and explain the reasons for the variance. The cost of purchasing or contracting out information collection services should be a part of this cost burden estimate. In developing cost burden estimates, agencies may consult with a sample of respondents (fewer than 10), utilize the 60-day pre-OMB submission public comment process and use existing economic or regulatory impact analysis associated with the rulemaking containing the information collection, as appropriate.**
* **Generally, estimates should not include purchases of equipment or services, or portions thereof, made: (1) prior to October 1, 1995, (2) to achieve regulatory compliance with requirements not associated with the information collection, (3) for reasons other than to provide information or keep records for the government, or (4) as part of customary and usual business or private practices**.

There are no non-hour cost burdens to respondents or recordkeepers.

14. Provide estimates of annualized cost to the Federal government. Also, provide a description of the method used to estimate cost, which should include quantification of hours, operational expenses (such as equipment, overhead, printing, and support staff), and any other expense that would not have been incurred without this collection of information.

The total estimated cost to the Federal Government for acquiring and analyzing information received as a result of this collection is $70,359 (table 4). This includes salaries and benefits. Table 4 below shows Federal staff and contractors performing various tasks associated with this information collection. This includes all phases of the survey, including questionnaire design and review, survey implementation and data collection, and statistical analysis and reporting. We used the Office of Personnel Management Salary Table 2017-DEN (https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2017/DEN_h.pdf) to determine the hourly rate for government employees. We then multiplied the hourly rate by 1.6 to account for benefits.

Table 4. Federal employee and contractor salaries and benefits

Position	Grade/ Step	Hourly Rate	Fully Loaded Hourly Rate	Annual Hours	Total Labor Value
Project lead, Social scientist	12/2	$38.71	$61.94	1,000	$61,940
Student contractor	NA	$32.38	NA	260	$8,419
Total				**1,260**	**$70,359**

15. Explain the reasons for any program changes or adjustments in hour or cost burden.

This is a new collection with new burden hours.

16. For collections of information whose results will be published, outline plans for tabulation and publication. Address any complex analytical techniques that will be used. Provide the time schedule for the entire project, including beginning and ending dates of the collection of information, completion of report, publication dates, and other actions.

The data collected during this study will be coded directly into a computerized database. Most of the statistics will be analyzed through the use of SPSS®. Data analysis will include several phases. The first will consist of frequency distributions of responses to each question. These will be reported as percentages. Cross tabulations will be used to investigate differences between groups of interest, including U.S. Federal and non-Federal users, U.S.-based and international users, and different sectors.

USGS Publication Series (Open File Report) and peer-reviewed publication to scientific journals are desired outlets for reporting this information. A schedule for the project is presented in Table 5 below.

Table 5. Project Schedule

Task	Date
Survey information collection	March, 2018
Data analysis	April-May, 2018
Report preparation	June-July, 2018
Final report publication	October, 2018

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.

We will display the expiration date for OMB approval on the survey instrument.

18. Explain each exception to the topics of the certification statement identified in "Certification for Paperwork Reduction Act Submissions."

We are requesting no exceptions to the certification statement.