LSI Explorer
Help Documentation

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I. Introduction

LSI Explorer (**http://lsiexplorer.cr.usgs.gov)** provides online search, browse display, data download, and exports of metadata to support scientists and users with access to earth science data from the archives of the cooperating Committee on Earth Observation Satellites (CEOS) members. LSI Explorer provides an enhanced user interface using state-of-the art JavaScript libraries, Hypertext Preprocessor (PHP), and the CEOS WGISS Integrated Catalog (CWIC).

A. **Key Features**

Key features in LSI Explorer include:

- Geospatial search engine
- Map viewer for viewing overlay footprints
- Simple, fast Graphical User Interface (GUI)
- Data access tool to search and discover data
- Access to browse images from standard products
- Updated software code base supporting JavaScript and PHP

B. **System/Browser requirements**

The following are the hardware and software requirements for using LSI Explorer:

- Hardware Requirements – Windows:
  - 233 Gigahertz (GHz) processor - 2GHz or better recommended
  - Minimum of 256 Megabyte (MB) Random Access Memory (RAM) - 4 Gigabyte (GB) recommended
  - Minimum of 20GB of free space - 100GB recommended
  - Display capable of 800x600 with 256 colors and 32MB of video RAM
  - Mouse
  - Keyboard
- Hardware Requirements – Apple Mac:
  - Intel x86 or PowerPC G3, G4, or G5 - 2GHz or better recommended
  - Minimum of 256MB RAM - 4GB recommended
  - Minimum of 20GB of free space - 100GB recommended
  - Display capable of 800x600 with 256 colors and 32MB of video RAM
  - Mouse
  - Keyboard
- Support handheld and tablet devices via browsers
- Network Requirements:
  - Broadband connection 15 Megabit per Second (Mbps)
  - 3G network impacts display speed

- Software Requirements:
    - Operating System: Windows XP, Windows Vista, Windows 7, Windows Server 2000, Windows Server 2003, Windows Server 2008
    - Mac OS X
    - Unix
    - Linux
    - Solaris
- Browsers supported:
    - Internet Explorer (7.x, 8.x, 9.x)
    - Firefox (3.x, 4.x)
    - Chrome (10.x)
    - Opera (10.x)
    - Safari (5.x)

II. User Interface

The LSI Explorer user interface provides the overall capability for you to interact with the LSI Explorer components and services. The LSI Explorer user interface is composed of the following key elements:

- Standard header/footer elements
- LSI Explorer menu bar
- Body

Figure 1 - LSI Explorer User Interface

A. Header/Footer Elements

The LSI Explorer header/footer elements are based on the [USGS Visual Identification Policy] standard guidelines. The LSI Explorer client is compliant with Section 508 guidelines.

1. Header

The LSI Explorer client header (Figure 2) is located at the top of the web page. The header is common across all web pages in LSI Explorer but may be different based on your user role or 'branding' applied to the LSI Explorer client.

Figure 2 - Header

Elements of the header include:

- CEOS LSI Logo (upper left corner) reflects the relevance of CEOS' work in today's world and communicates CEOS's purpose to the public.
- Title Bar is a standard bar describing the website; in this case, 'LSI Explorer'.

2. **LSI Explorer Menu Bar**

The LSI Explorer menu bar (Figure 3) is directly below the header. The LSI Explorer menu bar supplies a common starting point to access additional functionality, options, and preferences for the LSI Explorer client via links.

Figure 3 - LSI Explorer Menu Bar

The common menu items in the header include:

- Feedback – Provides a link to the feedback form.
- Help – Provides information about LSI Explorer.

3. **Footer**

The LSI Explorer client footer (Figure 4) is located at the bottom of the web page. The footer is common across all web pages in LSI Explorer.

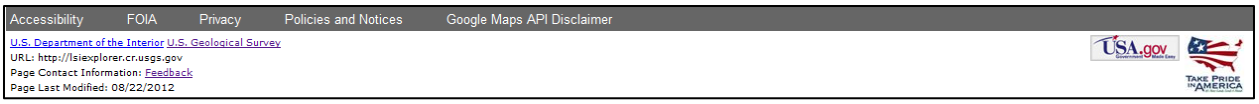

Figure 4 - Footer

The common menu items in the footer include:

- Accessibility - Provides a link to the USGS Accessibility Policy (Section 508). The USGS Accessibility Policy ensures that all electronic and information technology developed, procured, maintained, or used by the USGS is accessible to people with disabilities.
- FOIA – Provides a link to the U.S. Geological Survey Freedom of Information Act (FOIA) Electronic Reading Room. FOIA requests for a copy of USGS records can be made by any individual or public/private organization other than a Federal agency.
- Privacy – Provides a link to the USGS Privacy Policies. This information identifies USGS and the Department of Interior (DOI) privacy policies.
- Policies and Notices - Provides a link to the USGS Policies and Important Notices website. This information describes the principal policies and other important notices that govern information posted on USGS websites.
- Google Maps API Disclaimer – Provides a link to the Google Maps API Disclaimer. This information outlines the Google Map Application

Programming Interface (API) terms and conditions for using the Google Map service.

B. **Body**

The body includes the main LSI Explorer capabilities and is composed of the Search Criteria and the Google Map components.

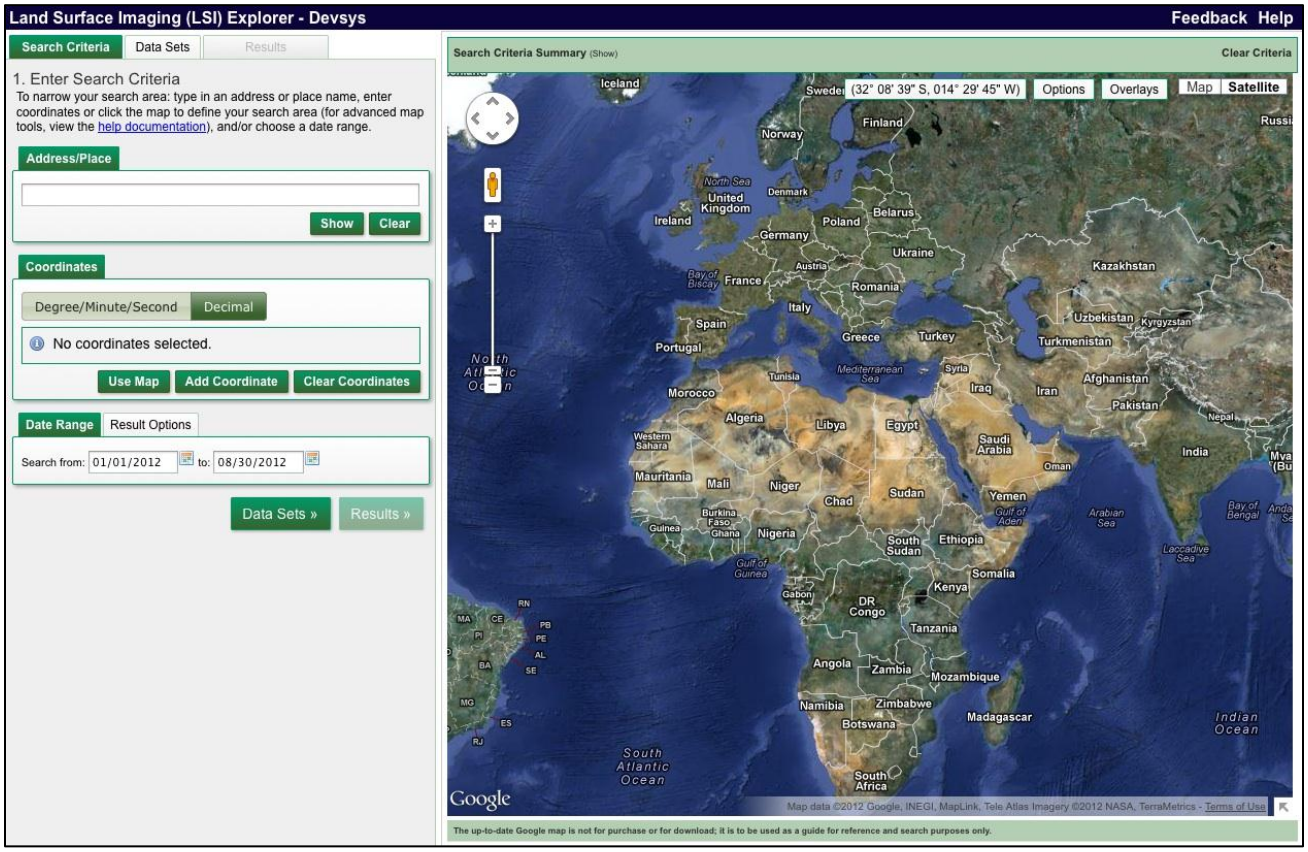

Figure 5 - Body

1. **Search Criteria**

The LSI Explorer Search Criteria component is located on the left side of the LSI Explorer body element. The Search Criteria component allows you to enter search criteria, select datasets to query, and review results in a tabular window. Additional details on the Search Criteria component are provided in the 'Perform a Search' in section III.

2. **Google Map**

The Google Map component is located on the right side of the LSI Explorer body element. The Google Map application interface embeds Google Maps within the LSI Explorer client.

Before using the Google Map component, you should be familiar with the navigation and location features provided in the Google Map interface that LSI Explorer uses.

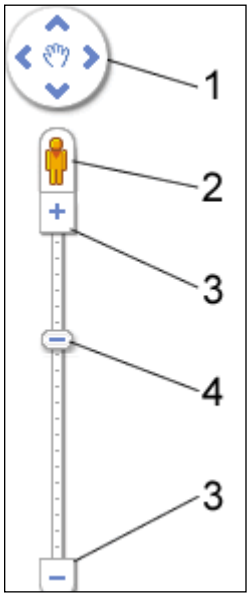

Figure 6 - Google Map Navigation Controls

Use the following controls to navigate Google Maps (Figure 6):

- Pan Control - Click the appropriate arrow to move the view north, south, east or west. (1)
- Street View – Click and drag to navigate to the street-level view of the interested area (2).
- Zoom – Click the plus sign (+) to zoom in to the center of the map; click the minus sign (–) to zoom out (3).
- Zoom Slider – Drag the zoom slider up/down to zoom in or out incrementally (4).
- Pan – Click and drag the map to the desired location or view.
- Use Page Up, Page Down, Home, and End for faster scrolling up, down, left, and right, respectively.
- Press Control and click the plus sign (+) to zoom in or press Control and click the minus sign (-) to zoom out.

The Google Map component provides the following custom location features to aid in locating geospatial data.

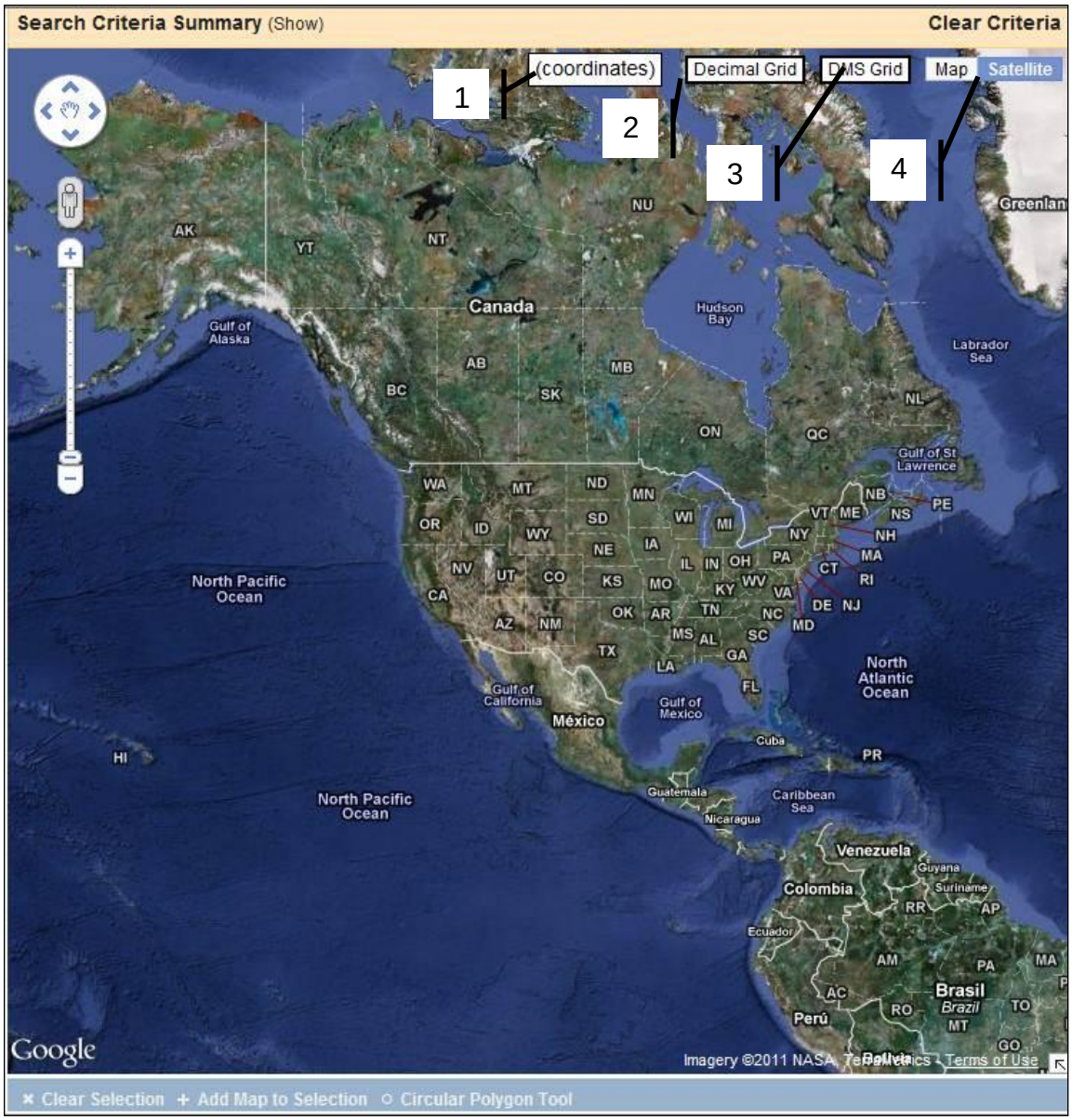

Figure 7 - Custom Location Features

Google Maps offers the following location features:

- Coordinates – Coordinate values update as you move the mouse on the map interface.
- Decimal Grid – Overlays a decimal degree grid over the map interface. Click to turn on and off.
- DMS Grid – Overlays a Degrees, Minutes, Seconds (DMS) grid over the map interface. Click to turn on and off.
- Map/Satellite – Toggles between the Map View and the Satellite View.
  - Map View:
    - Terrain – Shows basic topographic features.
  - Satellite View:

- 45° - Zooms to special 45° imagery for certain locations.
- Labels – Displays feature labels.

III. Perform a Search

LSI Explorer allows you to search, view browse images and download data held in cooperative CEOS archives through a number of query options. LSI Explorer uses tabs in the application to move through each portion of the search process. The LSI Explorer search process is divided into four main areas:

- Search Criteria Tab – Provides the interface for entering various search options.
- Data Sets Tab – Provides the interface for selecting the datasets you are interested in searching.
- Results Tab – Provides the interface for displaying a textual and graphical view of the query results.

Figure 8 - LSI Explorer Search Tabs

A. Search Criteria Tab

The Search Criteria tab provides a location to enter search criteria for an area of interest. You have the option to either type the location criteria via the textual information component or with the Google Map interface. The search criteria options include:

- Google Map Interface – Enter the area of interest through the Google Map interface
- Address/Place – Enter an address or place name
- Area Selected – Enter coordinates to define an area of interest. The area selected is updated when you select an area on the map or when you enter an address or place name
- Dates Selected – Enter a date or date range
- Number of records to return – Modify the number of scenes returned from a search.

1. Enter Area of Interest Search using Google Map Interface

Using the Google Map interface, enter the geospatial area of interest using the mouse or other pointing device.

Options for entering location criteria include:

a. Define a single point search – Click an area on the map once using the mouse to define a single point search. The latitude and longitude of the point selection displays in the ‘Area Selected’ box.

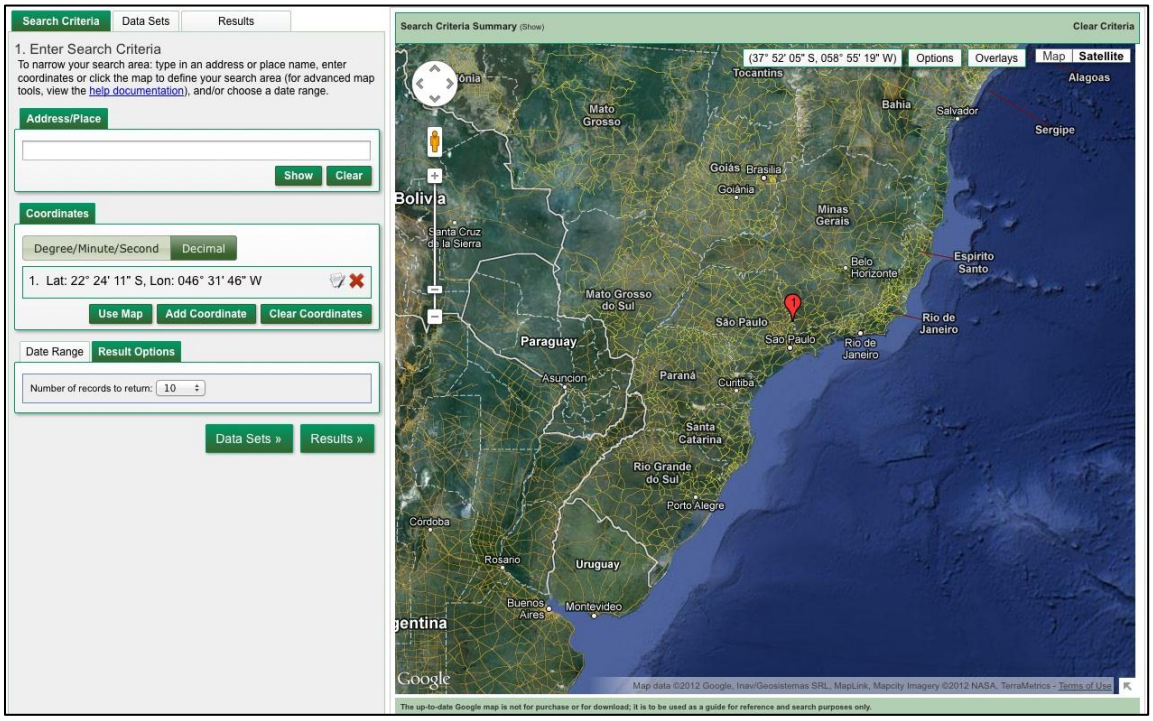

Figure 9 - Point Search

b. Define a line search – To perform a line search, select two points on the map to define a line segment. The latitude and longitude of the two points selected display in the 'Area Selected' box.

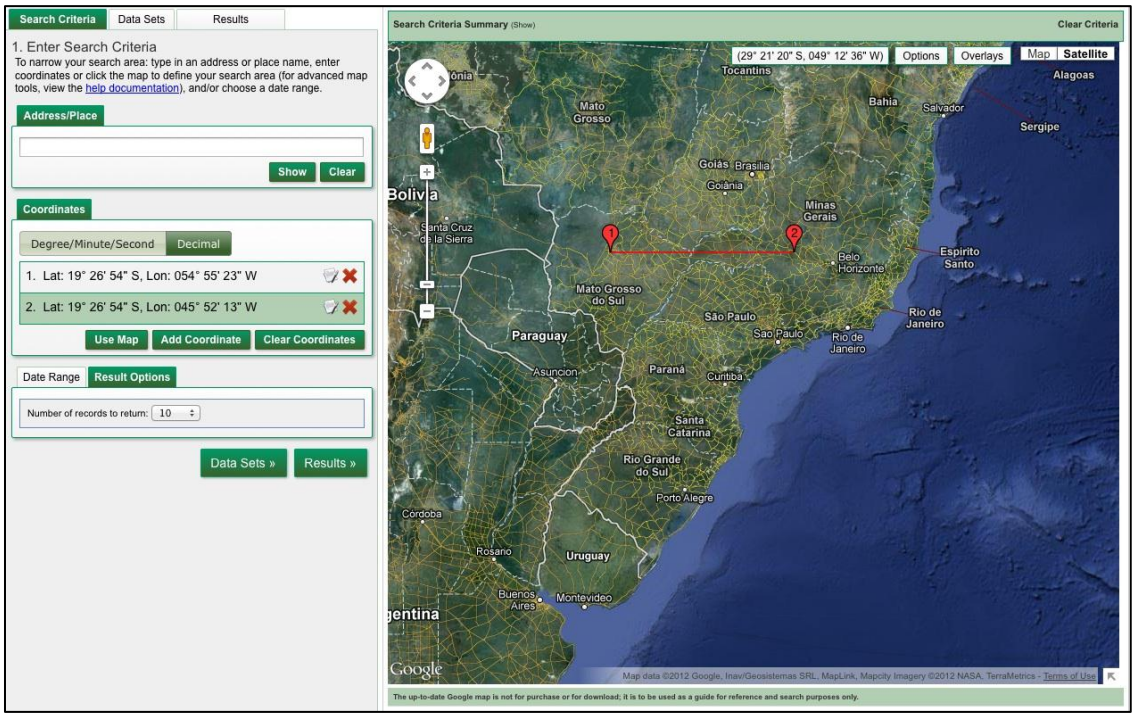

Figure 10 - Line Search

c. Define a rectangle search – Press the Shift key after starting the selection, and continue to hold the Shift key until the correct rectangle or square is defined. This action defines the constraints of the rectangle / square. If you

press the Shift key before making the selection, the resulting selection is added to the existing selection. The latitude and longitude of the four points selected display in the 'Area Selected' box. To modify the rectangle, click one of the numbered points on the map and drag the point to a new location.

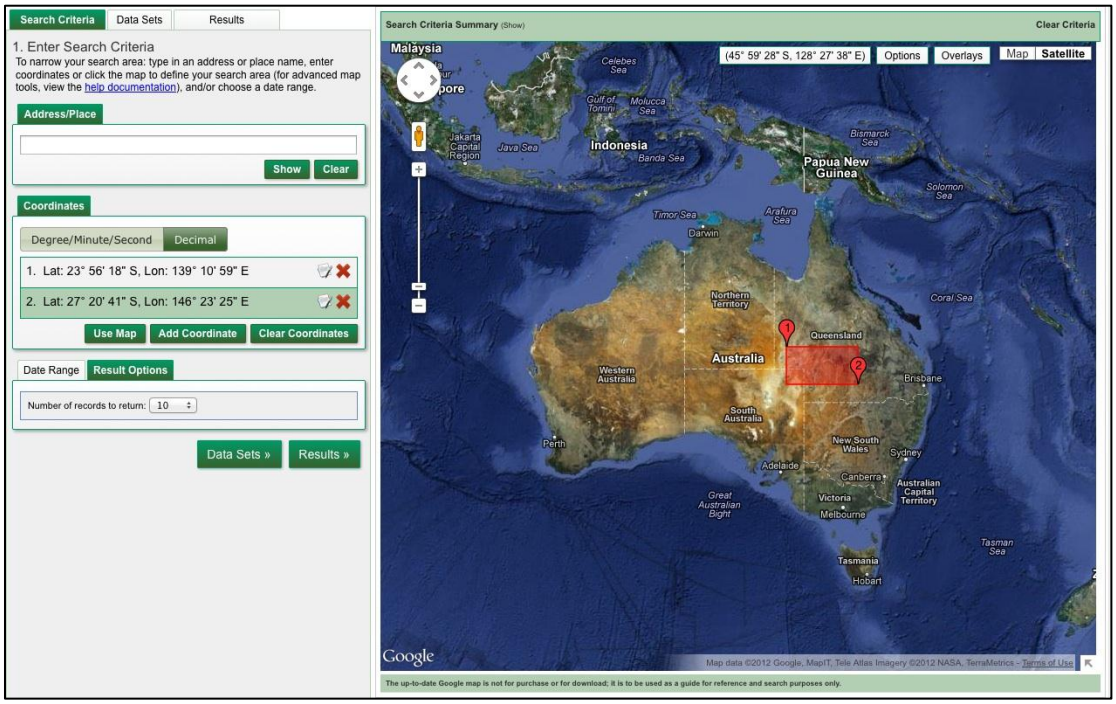

Figure 11 - Rectangle Search

Clear Selection (**Figure 12**) – Click the 'Clear Selection' button to clear the search criteria from the map.

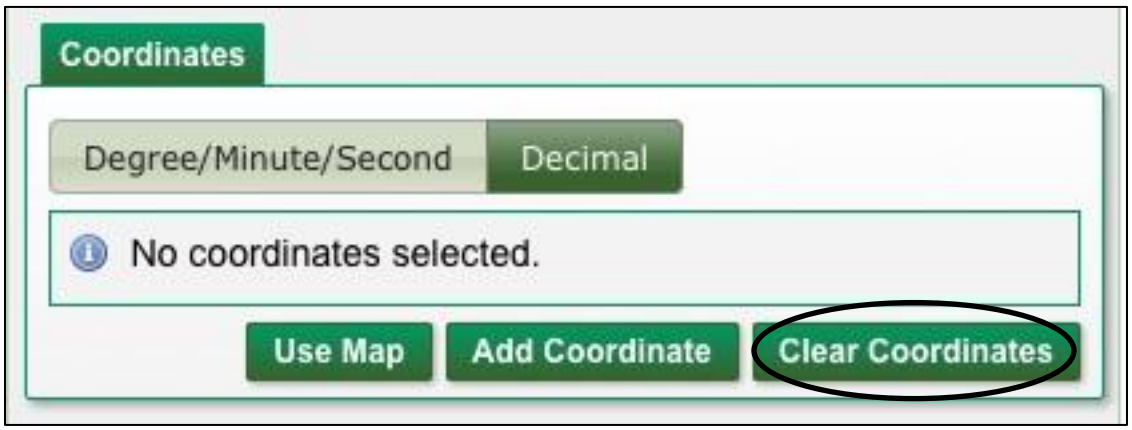

Figure 12 - Clear Selection

2. **Enter Search manually using the Area Selected**

To add or update the Area Selected coordinates, enter the location information using the Google Map interface or the Address/Place interface. A second way to define an area of interest is to manually type the latitude/longitude coordinates within the 'Area Selected'.

To enter latitude/longitude coordinates manually, select the 'Degree/Minute/Second' or 'Decimal' option. This method displays how the latitude/longitude information is entered. Click 'Add Coordinate.'

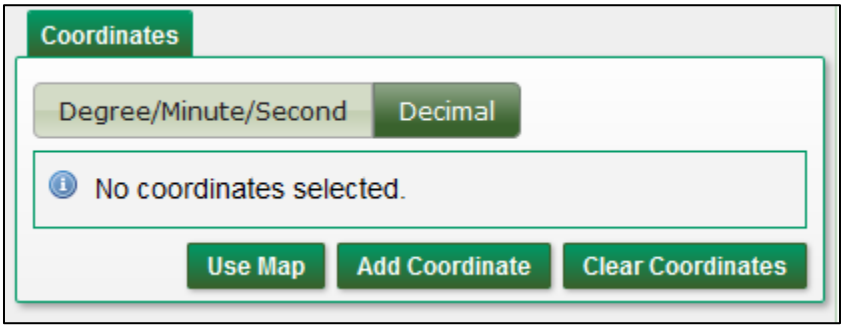

Figure 13 - Add Coordinate

Click 'Add Coordinate' to display the 'Add new Coordinate' dialog box. As shown in Figure 14, enter degrees, minutes, and seconds of a point in the dialog box. After clicking Add, the dialog disappears, the point displays on the map, and the coordinate is added to Area Selected. Use this method to enter multiple points.

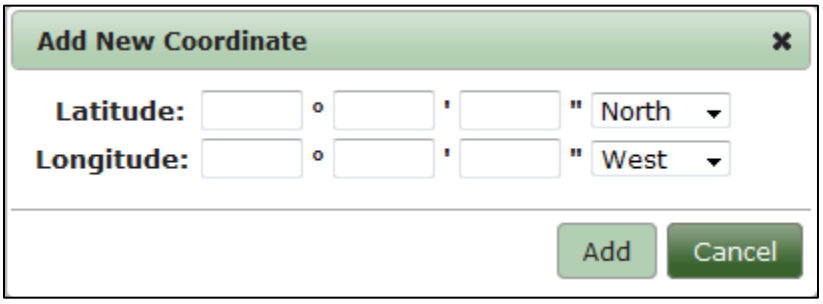

Figure 14 - Add New Coordinate

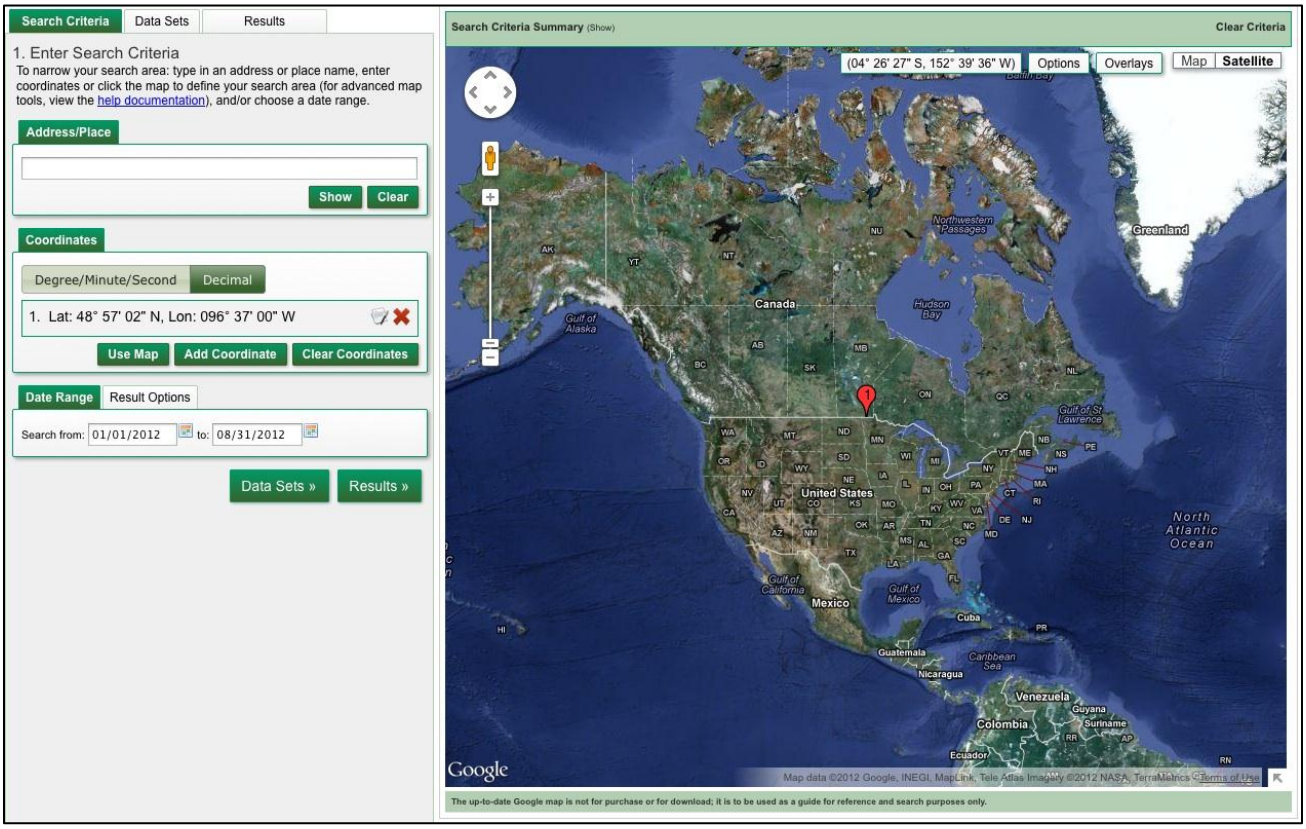

Figure 15 - Add New Coordinate Location

Click ✖ to delete a coordinate or click to edit a coordinate.

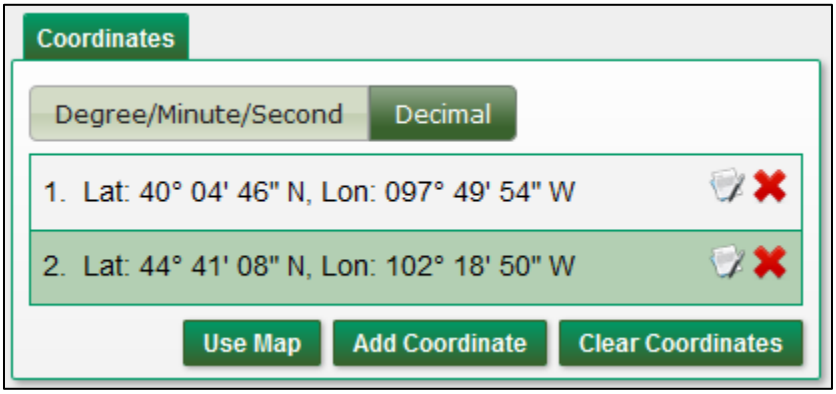

Figure 16 - Delete or Edit Coordinates

3. **Dates Selected**

The 'Dates Selected' option provides a method for entering a beginning and ending date range to refine the search criteria. You are not required to modify the default date range; however, a date range is highly recommended to reduce the number of search results returned from a search. 'Search Months' allows you to specify which months to search within the date range specified.

For example, Figure 17 shows a search range of 01/01/2012 to 08/31/2012.

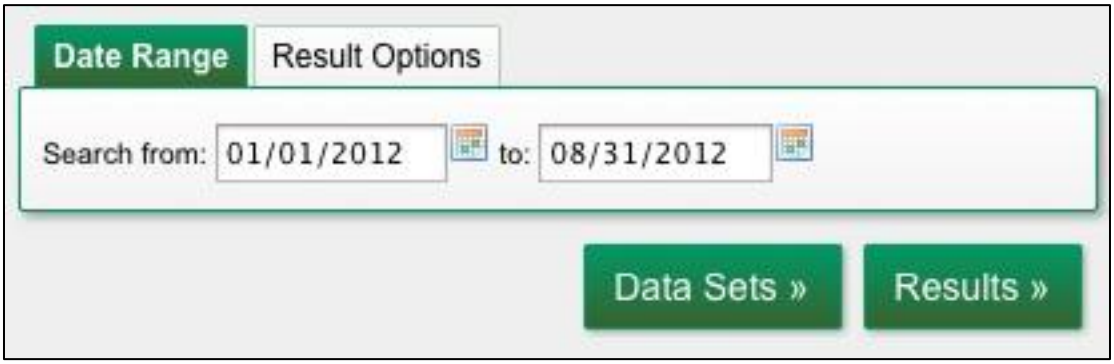

Figure 17 - Dates Selected

4. **Number of records to return**

The LSI Explorer interface allows you to select the number of records to return from a search. Use the 'Number of records to return' dropdown to select the maximum number of scenes returned.

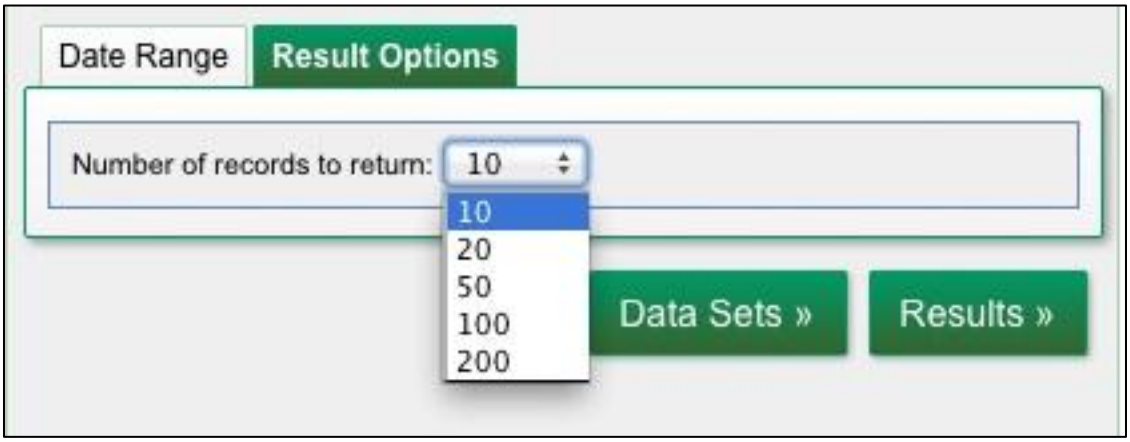

Figure 18 - Number of records to return

Once you enter the search criteria, click the 'Data Sets' tab at the top or bottom of the 'Enter Search Criteria' form.

B. Select Data Set(s):

The 'Data Sets' tab selects which dataset(s) to search.

Figure 19 - LSI Explorer Search Tabs – Data Sets

The 'Data Set' menu categorizes datasets into similar data collections. LSI Explorer uses a dynamic tree menu with expandable/collapsible links for each major data category. Click the plus sign (⊞) next to the category name to expand the list of datasets for that collection. Click the minus sign (⊟) next to the category name to collapse the list.

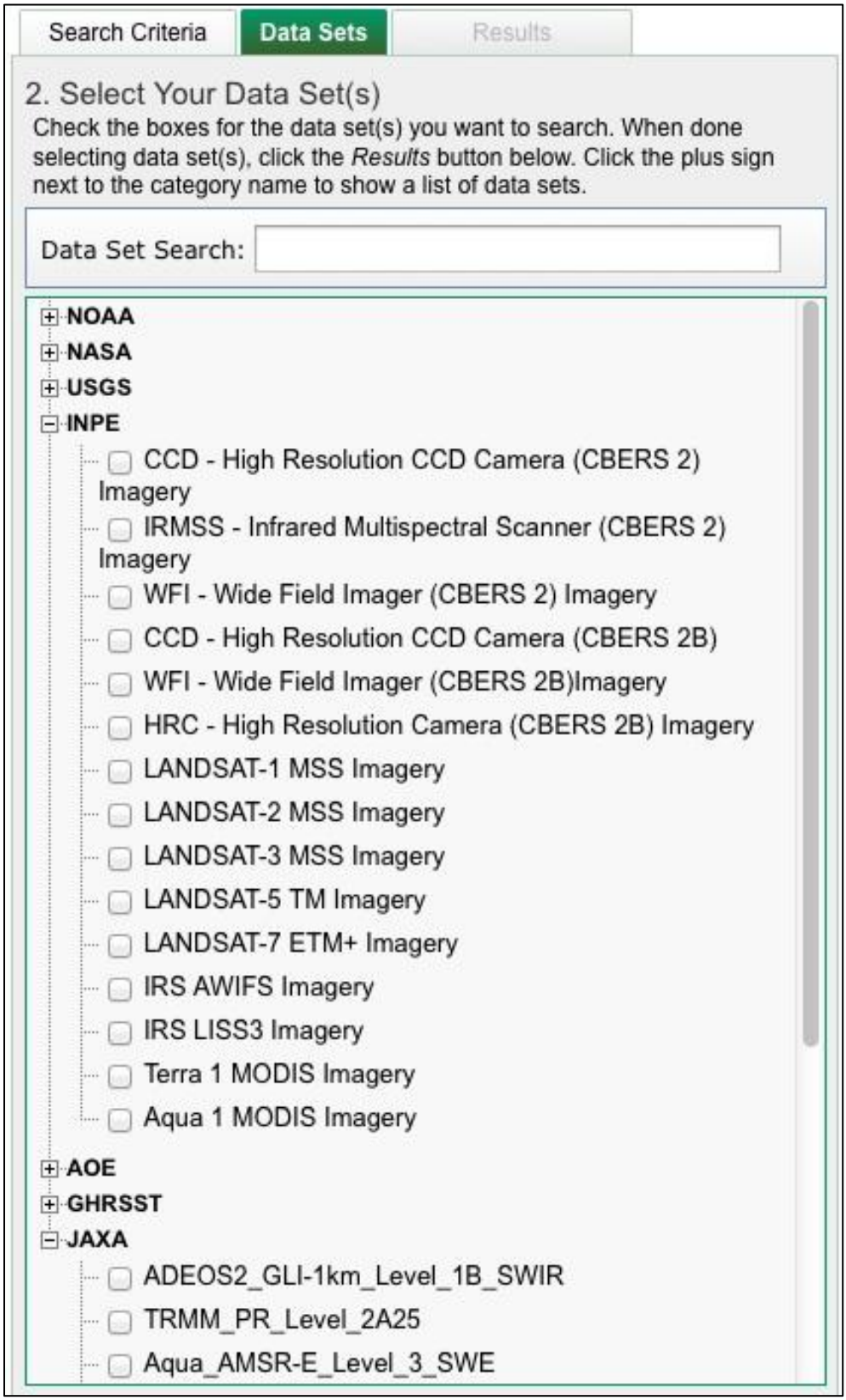

Figure 20 - Data Set Selection Expandable View

The majority of the datasets are available for download. The user may need to register in multiple systems to allow direct data access.

Click the ‘Clear All Selected’

button to unselect all datasets that were selected.

Click the ‘Results’ tab to execute the search and view the results for the criteria entered.

B. **View Search Results**

The ‘Results’ tab executes a search using the search criteria and displays the results for the search criteria. The left side of the page displays the results panel with the thumbnail and textual information for each scene returned from the search. The right side of the page displays the Google Map interface with an outline of the identified area of interest.

Figure 21 - LSI Explorer Results Tab

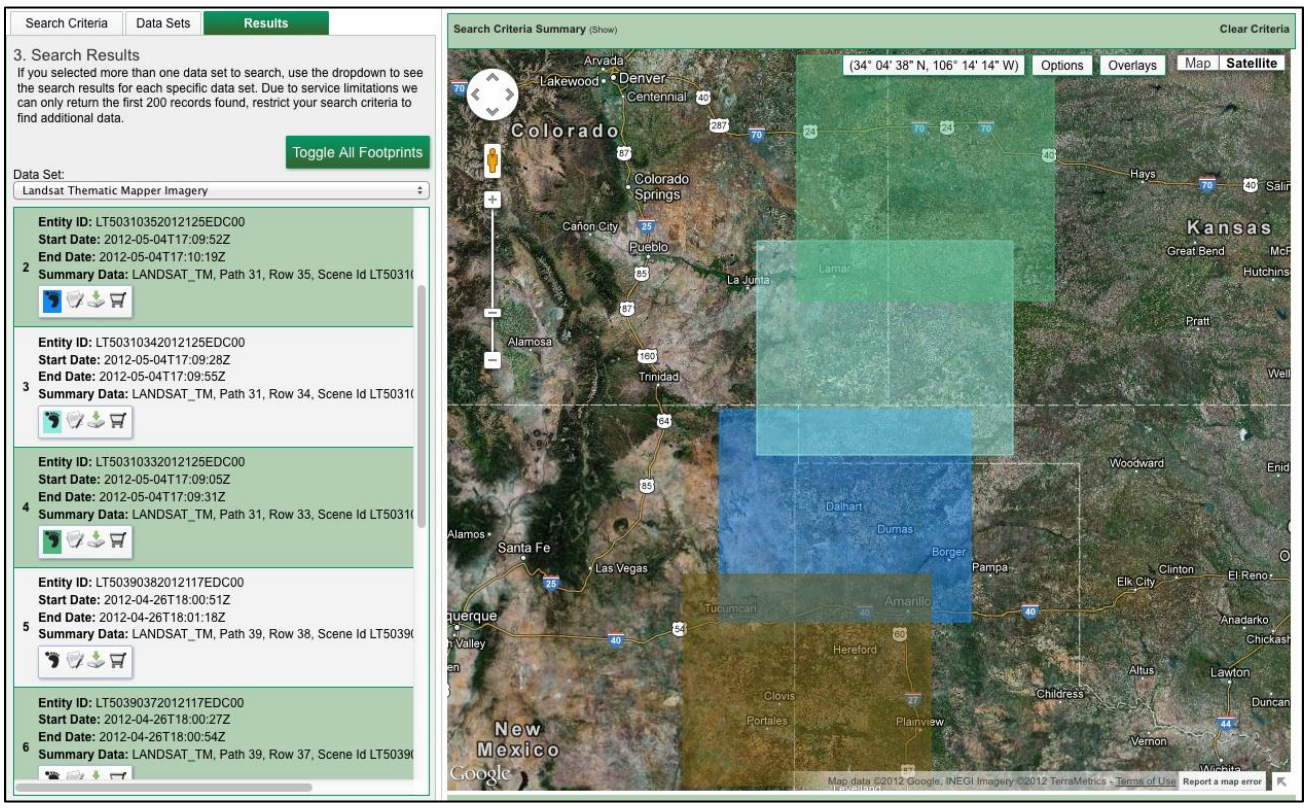

Figure 22 - Example Results

The Search Results panel includes the following components:

- Search Results List – Displays the thumbnail, textual information, icons to view details of each scene, view browse, and request downloads of data and other visualization controls for each record returned from the search
- Google Map Interface – Displays the search area, views footprints on the map for each scene through the Google Map interface.

Select ‘Toggle All Footprints’ to display footprints from the current page of results.

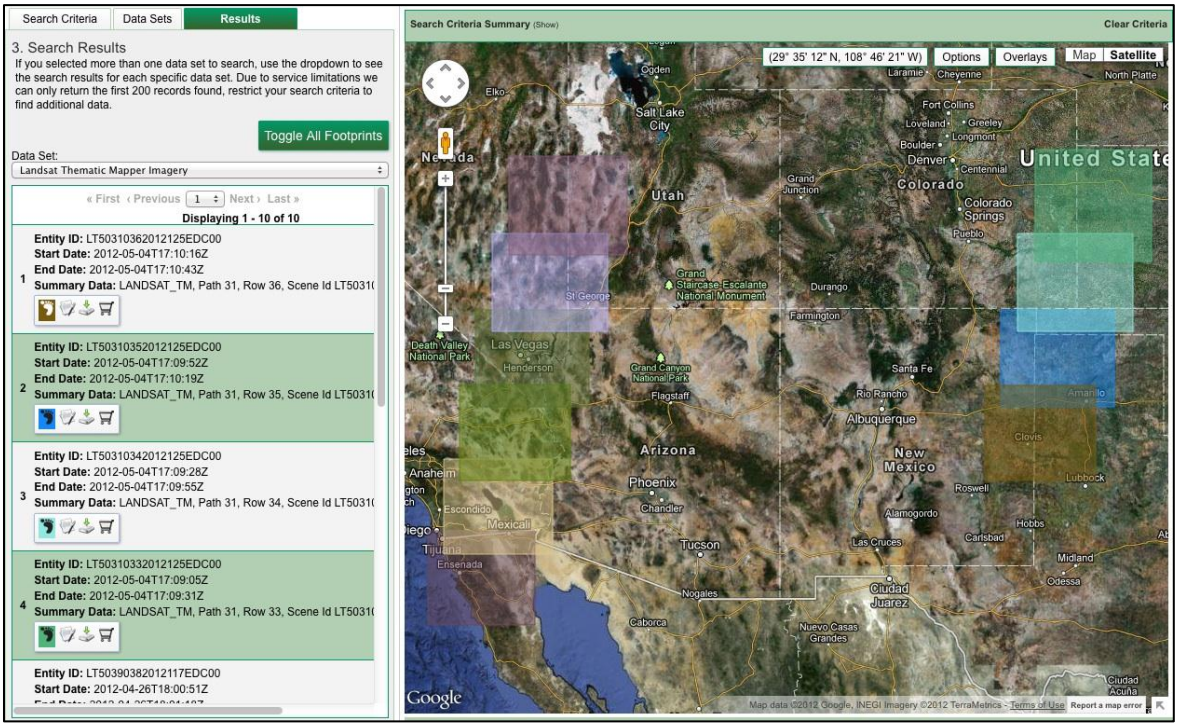

Figure 23 - Toggle All Footprints

5. **Search Results List**

The Search Results List provides the controls for displaying the search results. Each search result includes a thumbnail image, textual information on each scene, links to view browse and download, and other visualization controls.

a. Multiple Datasets

LSI Explorer searches multiple datasets. The results of the first dataset display in the results panel. Use the “Data Set” selection box to select and view each additional dataset.

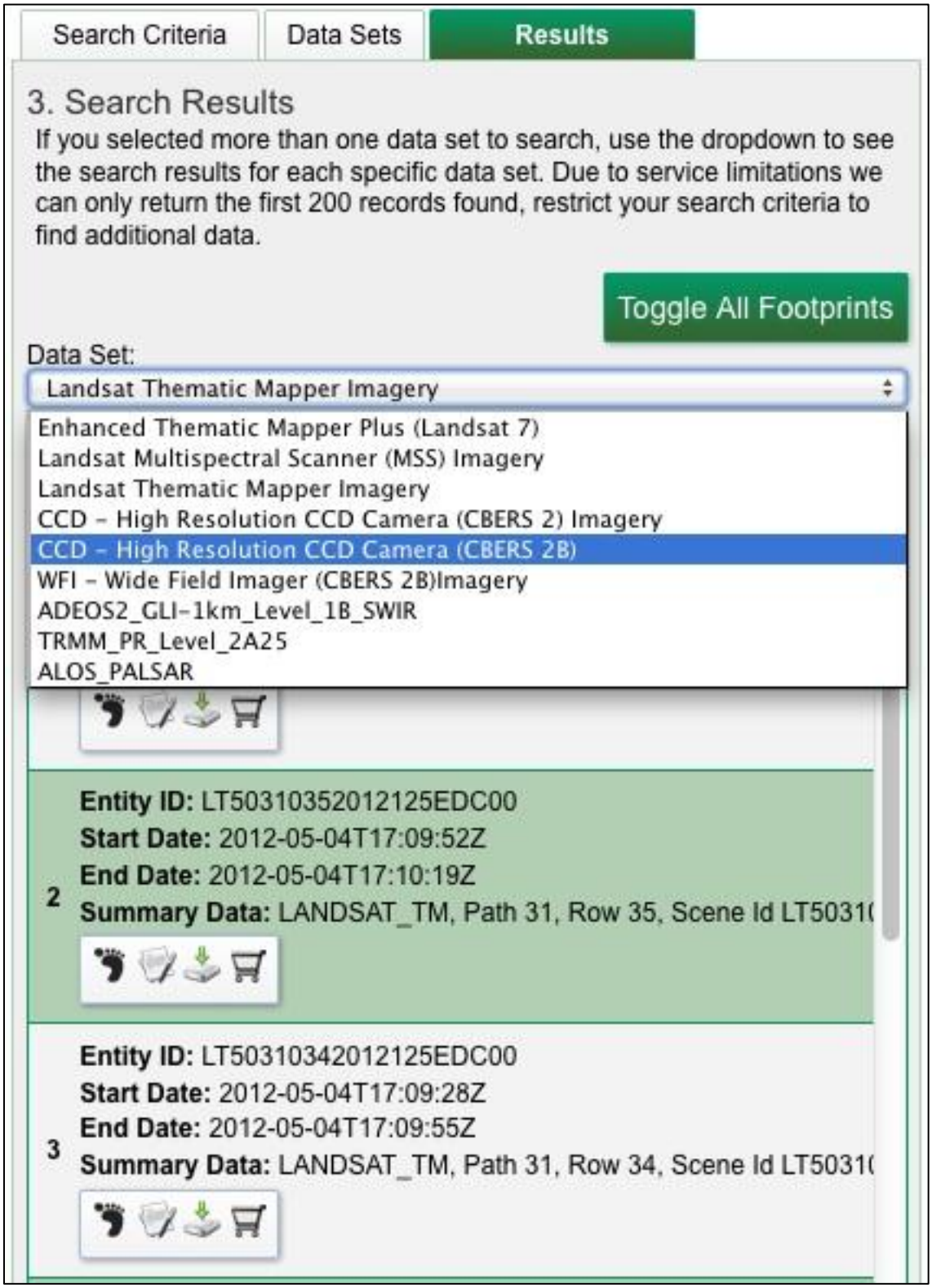

Figure 24 - Select Data Set Results

Figure 25 below displays an example of search results.

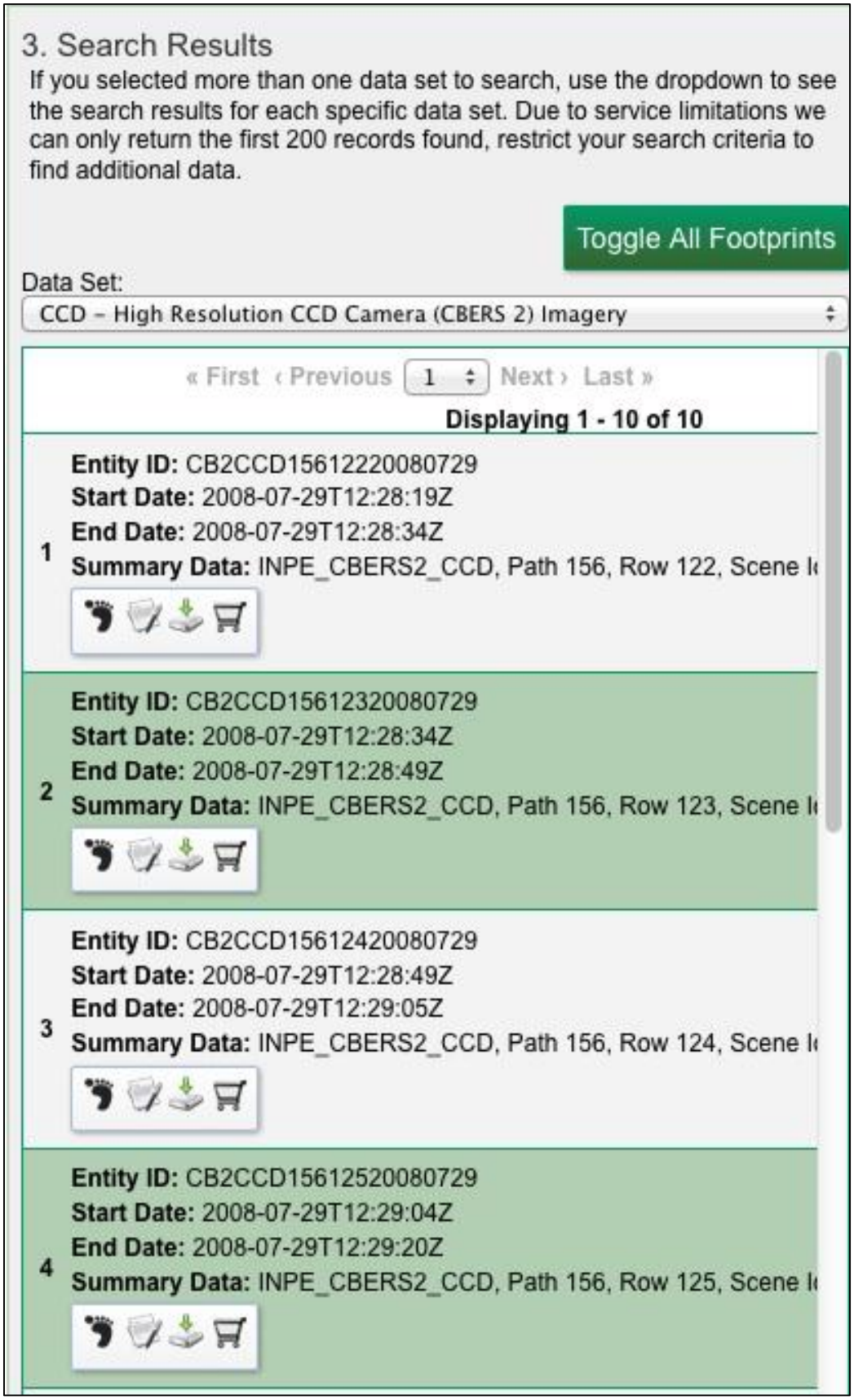

Figure 25 - Example Search Results

b. Overlay and Download Controls

Each search result record includes textual information on each scene, links to download data, and other visualization controls.

Figure 26 - Example Scene Level Results

The following is an overview of the overlay and download controls:

- Show Footprint – Select the 'Show Footprint' ( ) icon to display the footprint of the selected scenes on Google Map. When the footprint option is on, the footprint icon is highlighted. Click the highlighted icon to turn off the footprint option. Multiple footprints can be selected and displayed on the map. Each footprint displays in a different color.

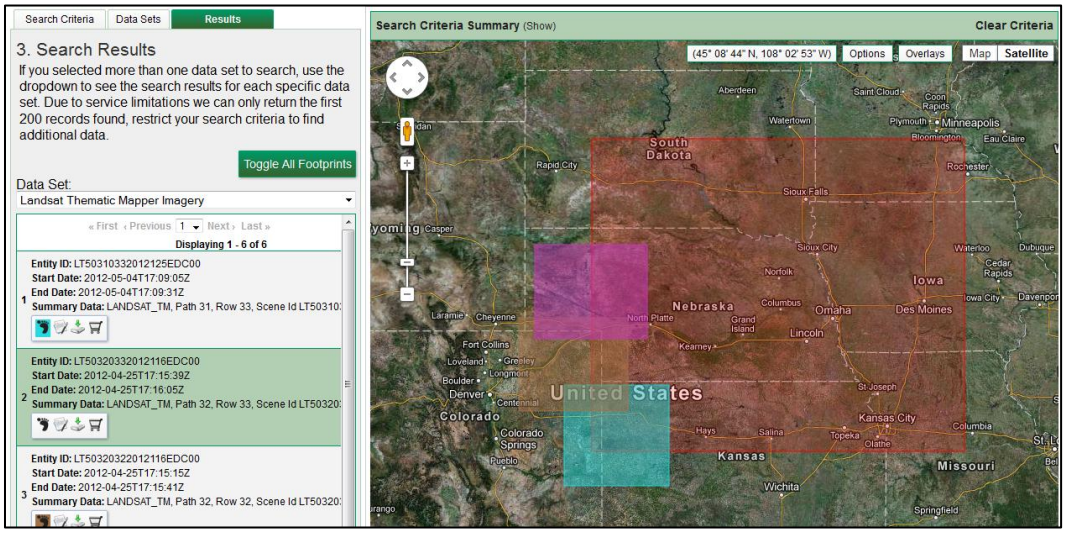

Figure 27 - Footprint Overlay

- Show Metadata - Click the thumbnail image or icon to display the full metadata for the selected scene.
- Download and Ordering Options – Downloads exist and reside, when applicable, on the vendors servers. LSI Explorer does not facilitate any downloading or ordering other than providing a direct link to the vendor website.

c. Search Results Controls

The LSI Explorer user interface controls on the Search Results include:

- Scroll bar – Click to view additional items returned from the search.
- Displaying X – XX of XX - Results Per Page – The default 'Results Per Page' is ten records.

Paging controls include the following:

- Page Number ( ) - Selects a different page of results
- Next - Displays the next page
- Previous - Displays the previous page
- First - Displays the first page
- Last - Displays the last page

Appendix

Acronym	Description
API	Application Programming Interface
CEOS	Committee on Earth Observation Satellites
CWIC	CEOS WGISS Integrated Catalog
DMS	Degrees, Minutes, Seconds
DOI	Department of Interior
EROS	Earth Resources Observation and Science Center
FOIA	Freedom of Information Act
GB	Gigabyte
GHZ	Gigahertz
GUI	Graphical User Interface
LSI	Land Surface Imaging
MB	Megabyte
Mbps	Megabit per Second
PC	Personal Computer
PHP	Hypertext Preprocessor
USGS	United States Geological Survey
WGISS	Working Group on Information Systems and Services