# The I4 Online Query Tool for Earth Observations Data

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The NASA Earth Observation System Data and Information System (EOSDIS) delivers an average of 22 terabytes per day of data collected by orbital and airborne sensor systems to end users through an integrated online search environment (the Reverb/ECHO system). Earth observations data collected by sensors on the International Space Station (ISS) are not currently included in the EOSDIS system, and are only accessible through various individual online locations. This increases the effort required by end users to query multiple datasets, and limits the opportunity for data discovery and innovations in analysis. The Earth Science and Remote Sensing Unit of the Exploration Integration and Science Directorate at NASA Johnson Space Center has collaborated with the School of Earth and Space Exploration at Arizona State University (ASU) to develop the ISS Instrument Integration Implementation (I4) data query tool to provide end users a clean, simple online interface for querying both current and historical ISS Earth Observations data.

The I4 interface is based on the Lunaserv and Lunaserv Global Explorer (LGE) open-source software packages developed at ASU for query of lunar datasets. In order to avoid mirroring existing databases – and the need to continually sync/update those mirrors – our design philosophy is for the I4 tool to be a pure query engine only. Once an end user identifies a specific scene or scenes of interest, I4 transparently takes the user to the appropriate online location to download the data. The tool consists of two public-facing web interfaces. The Map Tool provides a graphic geobrowser environment where the end user can navigate to an area of interest and select single or multiple datasets to query. The Map Tool displays active image footprints for the selected datasets (Figure 1). Selecting a footprint will open a pop-up window that includes a browse image and a link to available image metadata, along with a link to the online location to order or download the actual data.

The second web interface, the Meta-Data Search Tool, provides the ability to search selected datasets by geographic coordinates, time of data collection, or text within metadata records. Search results are either delivered in the form of browse images linked to the appropriate online database, similar to the Map Tool, or they may be transferred within the I4 environment for display as footprints in the Map Tool. Datasets searchable through I4 (http://eol.jsc.nasa.gov/I4_tool) currently include: Crew Earth Observations (CEO) cataloged and uncataloged handheld astronaut photography; Sally Ride EarthKAM; Hyperspectral Imager for the Coastal Ocean (HICO); and the ISS SERVIR Environmental Research and Visualization System (ISERV).

The ISS is a unique platform in that it will have multiple users over its lifetime, and that no single remote sensing system has a permanent internal or external berth. The open source I4 tool is designed to enable straightforward addition of new datasets as they become available such as ISS-RapidSCAT, Cloud Aerosol Transport System (CATS), and the High Definition Earth Viewing (HDEV) system. Data from other sensor systems, such as those operated by the ISS

International Partners or under the auspices of the US National Laboratory program, can also be added to I4 provided sufficient access to enable searching of data or metadata is available. Commercial providers of remotely sensed data from the ISS may be particularly interested in I4 as an additional means of directing potential customers and clients to their products.
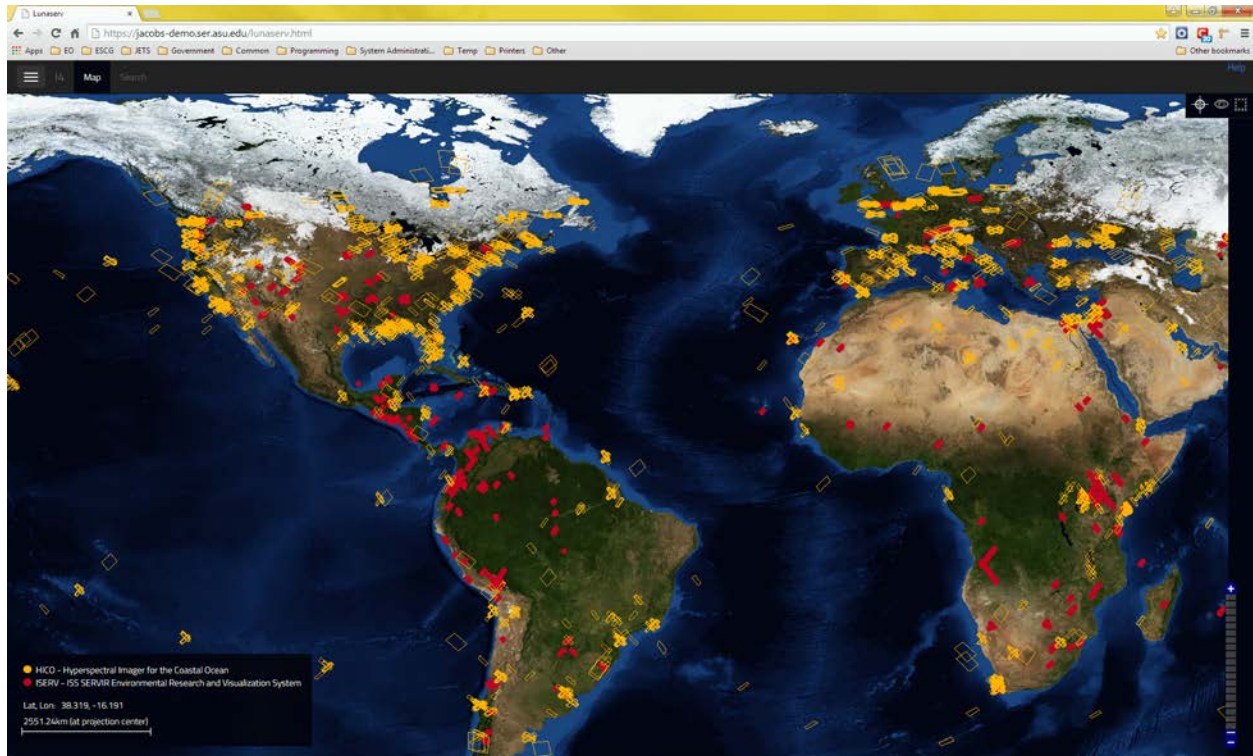


Figure 1. Screen capture of the I4 Map Tool interface illustrating a query search result for HICO and ISERV data collected from the ISS.